











**REPORT**  
ON THE  
**Epidemick Cholera Morbus,**  
AS IT VISITED THE TERRITORIES  
*SUBJECT TO THE PRESIDENCY*  
OF  
**BENGAL,**

*In the Years 1817, 1818, and 1819.*

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DRAWN UP BY ORDER OF THE GOVERNMENT, UNDER  
THE SUPERINTENDENCE  
OF THE  
**MEDICAL BOARD.**

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BY  
**JAMES JAMESON,**  
*Assistant Surgeon and Secretary to the Board.*

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1820.

Οὐ μέντοι τοσοῦτος γε Κοιμός, οὐδὲ φθεγξί οὔτε  
ἀνθεώπων οὐδαμοῦ ἐμνημονεύετο γενέσθαι. οὔτε γὰρ ιατροὶ<sup>1</sup>  
ῆρκουν τὸ πρῶτον θεραπεύοντες ἀγνοία—οὔτε ἄλλη ἀνθεώπεια  
τέχνη οὐδεμία.

—Λεγέτω μὲν οὖν περὶ αὐτοῦ ὡς ἔκαππος γιγνάσκει, καὶ  
ιατρὸς, καὶ ιδιάτης, ὃς ὅτου σικῆς ἦν γενέσθαι αὐτὸν, καὶ  
τὰς αἰτίας ἀστικῆς νομίζει τοσαύτης μεταξεῖδῆς ἴκανάς  
εἶναι δύναμιν ἐς τὸ μεταπτήσαι σχῆμα ἐγὼ Ὡὲ οἵον τε  
ἐγίγνετο τέλος, καὶ ὃ φ' ὁν ἄν τις σκοτῶν, εἴποτε καὶ αὐλίς  
ἐπιπίσσοι, μάλιστ' ὡν ἔχοι τὶ πρειδάς μὴ ἀγνοεῖν, ταῦ-  
τα δηλώσω.

Θουκυδίδ. Ἐνγγειαφ. 6.

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## PREFACE,

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GOVERNMENT being desirous that some record should be preserved of the Epidemick, which has recently visited Hindostan, instructions were issued to the Medical Board to draw up a report of its history and general appearances. As this could only be done, by obtaining, and carefully digesting, the collective experience of a large number of individuals, converant with the disease; it was resolved, to invite all the Members of the Medical Department, to contribute such facts as they might deem conducive to the ends in view.

The following letter was accordingly transmitted to every individual borne on the list. The form by queries was preferred, as pointing out, in a clear and distinct manner, the nature of the information wanted; and thus relieving the individual observer from the uncertainty, into which he might be thrown, were it left entirely to his own judgment, to determine, what he should withhold, and what contribute to the general stock.

SIR,

The Medical Board being called upon by Government to draw up for publication, a report on the rise, progress, and symptoms of the Epidemick, which has recently visited these Provinces; have directed me to request, that you will have the goodness to communicate to them, with all practicable convenience, such information as you may possess on the subject of the proposed enquiry.

The main objects of the enquiry being to discover, if possible, the hidden causes, which first originated, and afterwards gave such wide range to the disorder; and to elucidate the laws, by which its progress was regulated; the Board would wish chiefly to direct your attention to the facts bearing upon these points. They are sufficiently aware, that the springs of epidemical diseases, have hitherto escaped the ingenuity and penetration of medical men; and that even the most patient investigation, will in the present case, in all probability, only add one more, to the innumerable instances of our ignorance and shortsightedness, regarding these abstruse operations of nature. But this at least will be effected, by instituting a minute research into the history of the disease. The general body of the medical profession will be put in possession of a correct narrative of the cir-

circumstances, which marked the origin and progress of a malady, perhaps more destructive in its effects, and more extensive in its influence, than any other recorded in the annals of this country; and in the event of the future recurrence of such a pestilence, our professional brethren on this establishment will escape the feelings of apprehension and uncertainty, which it so generally produced on the late occasion; and be prepared to meet it with the most approved means of treatment.

It is by no means the intention of the Board to discourage you from giving a detailed description of the disease; or from transmitting to them notes of such cases as you may have kept with minuteness and accuracy. But the points, to which they would desire more particularly to beg your attention, as in their opinion the most essential to ascertain the nature and history of the disorder, are the state of the atmosphere, previous to, and during the time of its prevalence; the circumstances attending its rise, increase, decrease, or disappearance, in a tract of country, town, or village, camp or cantonment; the classes of persons, which it seemed particularly disposed to affect; and the peculiarities in the modes of life, or circumstances for the time being, of those attacked. To these may be added some re-

marks on the best means of resisting the disorder ; on its fatality, whether as to the mortality caused by it in particular districts, or to the proportion of deaths amongst a given number of persons seized, &c. &c.

It appears adviseable, for the sake of distinctness, to place these various subjects of investigation under separate heads ; and a number of queries is accordingly subjoined ; to which it is hoped, that you will find no difficulty in returning satisfactory answers.

*Query.* 1. When did the Cholera Morbus first appear in the tract of country, cantonment, or camp, coming under your observation ?

2. How long did it remain in that district, cantonment, or camp ?

3. What was the prevailing state of the weather, for some time before its appearance ; during its prevalence ; and at the period of its disappearance ? State the result of your observations (if you have kept any) on the barometrical and thermometrical changes, which may have occurred during the intervening period.

4. What direction did it seem disposed to take, in passing through the camp or district ?

PREFACE.

5. Did it affect all parts equally and indiscriminately?

6. Were the localities of the parts or villages more especially subjected to its influence, such as general experience has shewn to be, with respect to the miasmata arising from putrid animal and vegetable exhalations, particularly obnoxious to endemical diseases?

7. Did it leave any spots untouched? and what circumstances in them appeared to screen the inhabitants from its influence?

8. After wholly leaving a division of country, camp, or village, did it ever recur? and if so, under what peculiarities of weather, or localities of situation?

9. During its prevalence in any spot, was any one class of persons more liable to its attacks than another? and if so, by what peculiarities of life, as to diet, calling, habits, scite of habitation, age, sex, or caste, was this class distinguished from those less within its influence?

10. What might have been the average mortality amongst a given number seized? Did this vary at different seasons of the Epidemick?

and was the disease more violent in the early, than in the latter part of its progress?

11. Can you form any estimate, or probable conjecture, as to the sum total of mortality produced in the tract coming under your observation?

12. What appearances were presented on opening the bodies of those, who sunk under the disease in its different stages?

13. Of those attacked, did a greater number recover, of such as took medicine, than of those who did not?

14. What mode of cure was most generally successful?

15. Did bleeding appear to produce beneficial effects? and in what number of those whose veins were opened, was it found possible to make the blood flow?

16. Did calomel given in the first instance, and alone, appear to have any specific effect, in allaying the irritable or spasmodic state of the bowels?

17. Does it come within your knowledge, that any particular remedies were resorted to by

the Native practitioners ? and have you any information of the success, with which these were reported to have "been used ?

18. What were the usual sequelæ of the disease, as to constitutional effects, in severe cases ?

19. Did any instance of relapse, or secondary attack, come under your notice, after recovery had been well established, and the bodily strength restored ?

20. Have you any reason to suspect, that the disease was contagious ?

21. Were animals affected by the disorder ? and if so, what descriptions ?

22. Did it appear to you, that the Epidemick exerted any influence in lessening the frequency, or in modifying the symptoms, of fevers, and other disorders common to this country ?

Although the Board have thought it necessary thus to specify, under separate heads, those questions, which have appeared to them most momentous to a complete illustration of the matter under investigation ; they will gladly receive from you such information, on points that may have escaped their notice, as you may think proper to impart to them.

In conclusion, the Board, without further pressing the great importance of the subject upon your observation, place perfect reliance on your professional zeal; and entertain no doubt but, that actuated by a just regard for the interests of humanity, and the reputation of the Department to which you belong, you will take the foregoing queries into your most serious consideration; and by the results of your deliberation, enable them to perform the task allotted to them, with credit to themselves, and to the service over which they have the good fortune to preside.

I have the honor, &c.

MEDICAL BOARD OFFICE,  
*the 9th October, 1818.*

The foregoing appeal was not so productive as might have been expected. Of two hundred and thirty-eight individuals, to whom the letter was addressed, replies were received, from one hundred and twenty-four only.—Of these, twenty-four answered merely to state their inability, in any way, to assist the Board, in the proposed enquiry.—The remaining hundred communicated much valuable information; the whole of which it has been attempted to embody in the subjoined report.

In performing this task, it was earnestly wished, that no fact should be stated, without

mention being at the same time made, of the authority, upon which it rested ; and no general reasoning, or point of theory advanced, but with the name of the person from whom it was derived. It was hoped, that the share, which each had contributed to the general performance would thus be manifest ; and that no complaints could be fairly made of partiality, or unjust neglect.

But it was soon found, that the adoption of this plan would inevitably lead to prolixity and confusion. The facts were so numerous, that, if each were to be stated with its authority, the work would be swelled out to a most unreasonable size. They were often of a contradictory and imperfect nature ; so that the inference deducible from them, was to be obtained, partly from one person, and partly from another. The inferences to be drawn from the facts, were often different from those made by the person stating the facts ; or they had not at all occurred to him ; or they were such, as could only be made, from a comparison of his facts with others, with which he was unacquainted. Besides, that after all the facts had been stated, each on its proper authority, it would still have been necessary, for one individual to have combined and analyzed them ; so as obtain from the whole some general principles, and precise notions, as to the true nature of the disease. All would have else been

confusion and perplexity ; and the body of intelligence thrown together, however it might, in a certain sense, be said, to exhibit the results of general experience, would never have formed a plain and unembarrassed narrative of the progress and appearances of the Epidemick.

It was therefore determined to abandon this method ; and in its stead, to adopt the form of a digest or compendium of all the facts within reach. In doing this, the mode of describing diseases, usually adhered to by practical writers, has been followed, with as little deviation as possible ; that is, the symptoms have been treated of first ; then the causes, proximate, remote, predisposing and exciting ; then the mortality caused by the disease ; then some peculiarities observed by it ; and lastly the method of cure. To the whole have been prefixed an introduction describing the rise and progress of the Epidemick\* ; and a sketch of the Weather in Bengal, and in the Upper Provinces, during several years antecedent to its appearance.

In discussing the matters comprised under these various heads, it has been carefully endeavored, to adduce the whole of the facts seemingly bearing upon them ; and no pains have been spared, to collect from every accessible quarter, such collateral evidence, as appeared likely to assist in their elucidation. The object of the Essay being

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\* It has been since thought better to throw this into the body of the work.

purely practical, every bias to theory and general speculation has been cautiously avoided. No lengthened hypothetical reasonings have been entered into; and where any thing seemingly conjectural has been hazarded, it has been, either in the way of plain deduction from established facts, or of striking analogy with similar circumstances, the truth of which is universally admitted. The subjoined Table contains the names, designations, and places of experience of all the gentlemen, who have contributed to the formation of the work. Amongst so large a number, it cannot but have happened that the communications must be of very different degrees of value. All could not have the same field of observation; some from accident or ~~in~~ inclination would improve their opportunities more than others. But, it would be invidious to specify the quantum or value of the information communicated by different individuals; even if the step were not rendered unnecessary, by a constant reference in the body of the work to the situations principally visited by the Epidemick, connected with the specification in the annexed table of the Medical Officers, whose experience was chiefly derived from such situations. It may however be stated generally, that the intelligence regarding both the habits and treatment of the disorder, imparted by the Staff attached to the Left and Hissi Divisions, the Rajpootanu Force, and above all, the Centre Division of the Army, cannot be too

highly estimated. The Surgeons of the Centre Division have the principal merit, of clearly establishing the great utility of blood-letting, under certain circumstances; which had been previously left doubtful by the uncertain results of the practice in Calcutta, and other quarters.\*

It has been a prevalent opinion throughout the country, that the Epidemick was essentially different in nature from the Cholera Morbus of the Schools.—This is no doubt true, if by Cholera is meant only, the disorder occurring sporadically during hot weather in the higher latitudes, and usually accompanied with bilious vomiting. But it should be recollectcd, that the word *Cholera* is a generic term, comprehending many species or varieties of disease, all more or less differing from each other in their diagnostick symptoms.

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\* Besides the information derived from the general source, a valuable addition of facts has been obtained from the official reports communicated to the Board, from time to time, since the rise of the Epidemick, by Mr. Superintending Surgeon Dyer, and Mr. Superintending Surgeon Reddie.—The opinions of the latter Gentleman, which are always entitled to much respect, are in the present instance particularly deserving of regard, from his having enjoyed very extensive opportunities of witnessing the disorder in the Left Division and Rajpootan Force; and made the best use of them.

If it were consistent with the scope of this Report, it might be easily shewn, that a disease similar in all its appearances to that, which raged these provinces, has been known from the remotest antiquity ; and accurately described by the medical writers of every age.\*

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\* There is no detailed description of Cholera in Hippocrates or Galen ; but that the disease was perfectly well known to them is evident from a frequent reference to it in various parts of their works. It is however, described by Aretæus, Cœlius Aurelianus, and Paulus Aegineta. Aretæus Lib. II. Cap. 5, says : " Cholera is a most acute disorder ; for in it the matter, which had been congested in the gullet and upper part of the stomach is ejected by vomiting ; while all that had been swimming in the stomach and intestines is passed downwards. The fluids passed by the mouth *are at first like water* ; those by the anus, stercoreous, liquid, and of foul smell ; but if these are helped off by clysters, the motions are *first like phlegm*, then bilious. The disorder is light at first, without pain. Afterwards, however, constriction of the *Æsophagus* and *Cardia*, and violent pain of the belly, supervene. Should the disease still increase, the patient grows faint ; the limbs lose their strength ; the mind is greatly depressed ; there is abhorrence of food ; the sinews are contracted ; the muscles of the arms and legs cramped ; and the fingers and toes twisted. Vertigo and hiccough arise ; the nails grow blue ; the extremities cold ; and the whole body is shaken with rigors. When it comes to the height, then he is covered with sweat ; bile is poured forth upwards and downwards ; the bladder is spasmo-

The disorder, as it lately visited India, was new in this alone, that there it, for the first time, assumed the Epidemical form; and by the uni-

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dically affected and the urine suppressed; the voice is lost, and the pulse is exceedingly feeble. Death at length ensues; miserable and full of torments, from convulsion, and empty strangulated vomiting"—And Aurelian Lib. III. Cap. xx. "The attack is frequently preceded by disordered stomach, tension, anxiety, tossing, watchfulness, torment of the bowels; with noise, pain of the belly, and looseness, belching, nausea, flow of the saliva, and oppression of the *pæcordia*. At the commencement of the attack, there is vomiting, first of corrupted food, *then of humor*, and yellow bile, then of stuff like the white of an egg, then green and æruginous, and lastly black. Along with these humors there are others *white, like spittle*. The pulse becomes contracted; the joints grow cold; and the countenance dark.—There is great heat, and insatiable thirst; hurried breathing; contraction of the limbs; and tension of the sinews, and calves of the legs and arms. The *pæcordia* are drawn upwards, with pain like that of the Iliac Passion. Sometimes the ejections from the mouth are bloody. The countenance is collapsed; the eyes are red; and there is hiccough towards the end." The reader must not imagine, that with the Ancients *bile* had generally the contracted signification in which it is accepted by the Moderns. With them it was connected with all the vanities of the humoral pathology, and to quote an expression of Galen, was "of infinite variety of colours, from pale to jet black." With us it would sound ridiculous to speak of transparent bile; but not so with the old writers, as will clearly

versality of its attacks, became a much more general and grievous scourge, than it had hitherto appear from the following quotation from Celsus. \*In his eleventh Chapter, Book fourth, on the diseases of the Intestines, he says: " And first we must make mention of Cholera; because it seems to be a morbid affection common to both stomach and intestines.—For there is at one and the same time a vomiting and purging, together with inflation; the intestines are tormented; bile flows upwards and downwards, *at first like water*, then like the washings of recent flesh; sometimes white, sometimes black, or of various colour. Wherefore, from that name [Χολη bile] the Greeks have called the disease *Cholera*." He then goes on to state the other symptoms. In like manner Avicenna p. p. 492 and 502, Edit. Rome, 1593, distinctly mentions the *watery vomiting*, purging, spasms, loss of pulse, cold sweats, &c. and he is followed by several hundred Asiatic writers on physic. Without collecting further authorities the reader may be referred to Bontius, Sydenham, Riverius, Hoffman, Cleghorn, Sauvages; and above all, to the excellent accounts of Girdlestone (Essays p. 51) Curtis (Diseases of India, p. 44) and Johnson (Influence of Tropical Climates p. 396.) It is curious, that the disease is unknown in Egypt, though, there is there the same prevalence of South East winds, and great inequality of diurnal and nocturnal temperature, which have been in other quarters observed to accompany and accelerate its progress. Vide Prosper Alpinus, Chap. 7 and 8th. The disorder is unquestionably the Cholera Morbus of Sydenham, the Cholera Spontanea of Sauvages, the Spasmodic Cholera, Cramp, or Mort de Chien of Curtis, and Johnson. The Malady described by Dr. Girdlestone, differed in this, from the present Epidemick, that purging does not appear to have been a constant attendant on it.

been.—It had long existed partially in these Settlements, and previously to its late appearance, had been faithfully delineated by three Medical Officers in His Majesty's Service, Drs. Girdlestone, Curtis, and Johnson. At no time however, as far as can be learnt from strict enquiry, did it prevail generally over the country, previously to the autumn of 1817.\* Sometimes indeed, it broke out with such extreme violence in particular spots, as to raise great apprehension, lest it should spread in the manner of a pestilence. But no sooner had the peculiar circumstances, which gave rise to it in those quarters, ceased to exist, than the disorder rapidly declined; and left the places in the vicinity untouched.—Some of these instances are too remarkable to be passed over unnoticed, in an essay of this sort.

The first, which we shall mention, took place at Hurdwar about thirty-five years ago.—It is not unknown to our readers, that this is the spot, in which the waters of the Ganges first issue from the mountains into the plains. It is held

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\* We have examined the Native histories of Ferishtu and Ghoolam Hoosein, which contain an account of Indian affairs from the time of the Moohammedan Conquest to the close of Mr. Hastings' Government; but although they advert to the occurrence of frequent famine and plagues, they do not once mention Cholera; a strong proof, that it never was before general.

very sacred by the Hindoos; and every year at the full Moon of April, but more especially every twelfth year,\* an immense concourse of people assembles near it, for the purpose of ablution in the holy stream. It so happened, that the year 1783 was one of the twelfth years deemed peculiarly propitious ; and that the body of pilgrims then collected was unusually great, amounting, it is believed, to between one and two millions. It is the custom of the pilgrims to repair to the bed of the river, where they pass the night with little, if any, shelter: many persons being crowded together under the cover of a single blanket thrown out as an awning. The temperature is very variable : the days being hot and the nights cold, with heavy dews, and sudden chilly blasts from the clefts in the mountains.

On the present occasion these causes<sup>t</sup> were sufficient to generate the Cholera ; which broke out soon after the commencement of the ceremonies, and raged with such fury, that, in less than eight days, it is said to have cut off above twenty

\* During April of every twelfth year, the Sun is in *Quarius*. This Sign is by the Natives called *Koombh*; and the fair of this year, the fair of the *Koombh*.

<sup>t</sup> One manuscript in our possession says: "the disease broke out on the springing up of an Easterly or land wind during a hot night, and carried off innumerable persons."

ty thousand victims. But so confined was its influence, that it did not reach the village of Ju-walapore, only seven miles distant; and ceased immediately upon the concourse breaking up, on the last day of the festival.

The next instance, which we shall quote, occurred two years before, in the Northern Circars: the narrow belt of land extending North and South from Ganjam to Chicacole, along the sea coast, and bounded by high hills to the West, and by the sea to the East. A Division of Bengal Troops, consisting of about five thousand men, was proceeding, under the Command of Colonel Pearse of the Artillery, in the spring of 1781, to join Sir Eyre Coote's Army on the Coast. It would appear, that a disease resembling Cholera had been prevalent in that part of the country some time before their arrival: and that they got it at Ganjam on the 22d of March. It assailed them with almost inconceivable fury. Men in perfect health dropt down by dozens; and those even less severely affected were generally dead, or past recovery, within less than an hour. The spasms of the extremities and trunk were dreadful; and distressing vomiting and purging were present in all. Besides those who died, above five hundred were admitted into Hospital that day. On the two following days the

disease continued unabated, and more than one half of the Army was now ill. Hitherto the Commanding Officer had struggled forward; hoping to reach more healthy ground; but it was now found impossible to move further. Almost all the servants and Camp followers had deserted; and although the greater part of the train and magazine had been left behind, there was no longer sufficient carriage to convey the sick. The scene was most distressing. To use the words of Colonel Pearse, "Death raged in the camp with horror not to be described; and all expected to be devoured by the pestilence. In vain I studied to discover the cause of our misfortune. I attributed it to poison; but at length found, that there had been a pestilential disorder raging in the parts through which our first marches lay, and that part of our Camp was already drinking the air of death and destruction." The road was strewed with the dead; and the Detachment was scattered through a space of more than thirty miles. The sick in Hospital now amounted to 1143. It was therefore determined to halt a few days at Itchapore; the inhabitants of which gave up part of the town for the accommodation of the Troops. The good effects of this step were immediate and striking. The hopes of the sick began to revive; the deaths became fewer; and no more fresh cases were admitted. By the 29th the

sick were diminished to 908 ; and on the first of the following month, the army was enabled to recommence its march : leaving about 300 convalescents behind. The total number of deaths is not stated ; but it is learnt from oral communication with individuals who were present with the Detachment, not to have fallen short of seven hundred men. As was generally the case in the several Divisions visited by the late Epidemick, the disease first attacked the camp followers ; then the Sepoys ; and lastly the Europeans. But few Officers were affected ; and of these only one died. It is clear, that the disorder was totally new to all persons in Camp. It was at first attributed to fatigue and irregular living ; then to poison. The bodies of such as died presented strong appearances of poison.—It was likewise discovered, that the natives of those districts used Euphorbium instead of Soap in washing, and that the troops unwittingly drank the water of the ponds impregnated with it.—But when it was found that the disease did not decrease, upon proper precautions being taken in this respect ; it was with greater justice referred to the heavy dews and great vicissitudes of the weather, connected with the peculiar situation of the troops.—They had been marching almost incessantly for six days, through sand and salt water ; and were at length so enfeebled, as scarcely to be able to

move. A violent wind blew day and night along the whole shore ; and although it was not quite so strong at night, it was then accompanied with such a penetrating moisture, as to wet through the thickest woollen cloaths.—The troops were besides, in no condition to withstand the inclemency of the season.—They had no tents ; and few possessed even a blanket to shelter them on getting to their ground. They generally marched in the night ; and many suffered by incautiously lying down, while warm from exercise, and falling asleep, exposed to the influence of a damp and noxious atmosphere.—The mode of treating the sick is not mentioned in any of the documents to which access has been obtained.—It is however stated in one of Colonel Pearse's dispatches, that not an ounce of opium was used in the Army ; and tradition gives reason to fear, that Emeticks of Tartarized Antimony were too freely used.\*

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\* The occurrence of the disease on this occasion is noticed in a letter dated the 27th April, 1781, from the Supreme Government to the Court of Directors ; and the destruction which it caused in this Detachment, mentioned in terms of becoming Regret. After advertizing to its progress in the Circars, the letter thus proceeds : " The disease to which we allude, has not been confined to the Country near Ganjam. It afterwards found its way to that place (Calcutta) ; and after chiefly affecting the Native Inhabitants, so as to occasion a great mortality during

There seems to be something in the situation and climate of the Northern Circars, which peculiarly disposes to the production of Cholera; for we find that a second Detachment of Bengal troops marching under Colonel Cockerell for Seringapatam, in the spring of 1790, was affected in a similar way with that of Colonel Pearse. This Detachment moved from the vicinity of the Soobanreeka River in the end of March. As it proceeded Southward, the weather became warmer. A fresh Southerly wind prevailed during the day; increasing in strength as the Sun ascended to the meridian; gradually becoming moderate as it declined; and dying away with the close of the evening.—A calm night succeeded; close and sultry in the early part; and damp and chill, with heavy dew, and slight Easterly wind from the Sea, towards morning. The atmosphere was during the day overshadowed with

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the period of a fortnight, it is now generally abated, and pursuing its course to the northward." It would have been interesting to have traced this disease, as it seemed to fit on the Epidemical form, but every attempt to discover its further progress has proved fruitless. Even the few facts regarding it however, which have come to light, had they been known sufficiently early, would have required, that the assumptions in the text, as to the previous non-epidemic existence of the disorder, should have been at least softened down. But access was not had to the letter, until this report had gone before Government.

thick white clouds; and loaded with vapours. The Cholera commenced late in March; but was not general till the 15th of April, when its activity was heightened by a heavy squall of wind and rain, which over-took the Detachment at Manikpatam, on the North side of the Chilka Lake. From this time till the middle of June, when the Detachment had passed Ellore, and the weather had become more moderate, from frequent falls of rain, the disease proved very fatal. As in Colonel Pearse's Division, the troops had no tents, and were sheltered from the inclemency of the night only by the thin covering of a country blanket stretched across a bamboo ridge pole; and even this comfort was not possessed by the camp followers. The troops were much harassed by long marches, on a sandy soil frequently not affording water; and from the difficulty of dragging the guns over very bad roads, they sometimes did not reach their ground until sunset. In the middle of the day the thermometer rose as high as 124. The disorder was characterised by precisely the same symptoms, which marked the late Epidemick. It began with violent pain and spasm of the stomach and bowels; which were followed by purging, vomiting, and all the signs of extreme debility. Luckily laudanum and cordials were resorted to for its cure; and it did less mischief, than in the former Detachment.

As far as has been ascertained, these are the only instances, in which the disease could at all be said to have assumed the epidémical form, prior to 1817. It is indeed rumoured, that it overran the Province of Bundekund about forty years ago ; and was exceedingly destructive in Bengal some time near the end of the last century. But if it were so, how does it happen, that no record has been preserved of its destructive effects, and that the oldest Inhabitants, when applied to, can give no specific information on the subject ? The truth is, that as an Epidemick the disease is quite new. Let us hope, that like other pestilences, with which Providence has from time to time been pleased to afflict mankind, it will prove only of temporary duration ; and that these Provinces will soon regain their wonted salubrity.

MEDICAL BOARD OFFICE, }  
• Calcutta ; }  
1st July, 1819.

**NAMES of the MEDICAL OFFICERS who principally contributed the information contained in the following Report.**

NAMES.	APPOINTMENTS.	} PRINCIPAL SEATS OF EXPERIENCE.
Supg. Surgn. A. Gibl,	Meerut, - - - -	Meerut.
Do. do. I. Hamilton,	Benares, - - - -	Chunar District.
Do. do. A. Ogilvie,	Kurnal, - - - -	Brig. Arnold's Force, Hansi.
Do. do. J. Dyer,	Cawnpore, - - - -	Nagpore Force.
Do. do. G. Reddie,	Rajpoetana, - - - -	Left Divn. and Raj- pootana Force.
Do. do. A. Dickson,	- Saugor,	Mutra.
King's Surgn. I. F.		
Smet,	H. M. 8th Lt. Drags.	Meerut.
Do. do. R. Spencer,	H. M. 21st do. do. -	River and Cawnpore.
Do. do. Thos. Jackson,	H. M. 1st Bn. 14th Regt. of Foot, -	Meerut.
Co.'s Surgn. Thos.		
Yeld,	Benares, - - - -	Benares.
Do. do. S. Durham,	Medical Depot, Cawn- pore, - - - -	Cawnpore.
Do. do. Chas. Hunter,	8th N. I. - - - -	Centre Division.
Do. do. Js. Johnston,	Furruckabad, - - -	Futtigurh.
Do. do. W. L. Grant,	Moorshedabad, - - -	Moorshedabad.
Do. do. J. Ridges,	5d N. C. - - - -	Centre Division.
Do. do. J. Langstaff,	2d Bn. 25th N. I. -	Centre Division and Oude.
Do. do. J. Gibb,	Stud Poosa, - - -	Tirhoot.
Do. do. David Todd,	Dacca, - - - -	Dacca.
Do. do. John Swiney,	Garrison Fort William, Calcutta.	
Do. do. Peter Breton,	Ramghur Bn. - - -	Sumbhulpore.
Do. do. R. Williams,	8th N. C. - - - -	Rewah Frontier.
Do. do. George Skip- ton,	21st N. I. - - - -	{ March from Kishen- gunge to Allahabad.
Do. do. Colin Camp- bell,	Horse Artillery, - - - -	{ Centre and Left Di- visions.
Do. do. E. Impey,	Cavalry Depot, - - - -	Cawnpore.

NAMES.	APPOINTMENTS.	PRINCIPAL SEATS OF EXPERIENCE.
Co's Surgeon G. G.		
Campbell, - - -	Medical Depot, Agra.	Agra.
Do. do. S. Ludlow, -	Delhi Residency,	Delhi.
Do. do. Thos. Tweedie, - - - - -	7th N. C. - - - - -	Mooltaye.
Do. do. John Marshall, - - - - -	4th Regt. N. C. - - -	Kishengunge.
Do. do. Oswald Hunter, - - - - -	6th R. N. C. - - -	Buxar,
Do. do. David Renton, - - - - -	1st R. N. C. - - - -	Mullie.
Do. do. Thos. Crichton, - - - - -	2d Bn. 3d N. I. - - -	Centre Division.
King's Acting Surgn.		
Badenach, - - -	H.M. 59th R. of Foot,	Calcutta.
King's Asst. Surgn. I.		
Fawcett, - - -	H. M. 24th R. of Foot	Dinapore.
Do. do. M. Owen, -	H. M. 1st Bn. 87th R. of Foot	- - Centre Division.
Com's. Asst. Surgn.		
Js. Mellis. - - -	Nuddea, - - - - -	Nuddea.
Do. do. A. Hall, - -	1st Bn. 1st N. I. - -	Malwa.
Do. do. Wm. Farquhar, - - - - -	Agra, - - - - -	Agra.
Do. do. P. Mathew, -	2d Bn. 21st N. I. - -	Sooltanpore Oudc.
Do. do. G. O. Gardner, - - - - -	Backergunge, - - -	Backergunge.
Do. do. J. Castle, -	1st Bn. 6th N. I. - -	Malwa.
Do. do. Andrew Brown, - - -	Bullooah - - - - -	Bullooah.
Do. do. Chs. Stuart, -	Jungle Meauls, - - -	Rajshahy.
Do. do. J. John Hogg,	Garrison Monghyr, - -	Monghyr.
Do. do. J. Adams, -	Ally Ghur, - - - - -	Coel.
Do. do. Robert Tyler	Allahabad, - - - - -	Jessore and Allahabad.
Do. do. George Ballie,	Resy. Court of Holkar	Malwa.
Do. do. James Grier- son, - - - - -	Doing duty 1st Bn. 15th N. I. - - -	Lucknow.

## NAMES OF MEDICAL OFFICERS.

XXVII

NAMES.	APPOINTMENTS.	PRINCIPAL SEATS OF EXPERIENCE.
Co.'s Asst. Sur. G. Lambe,	1st Rampura Local B.	Oude.
Do. do. Js. Ranken -	Surgn. Pol. Agent, Loodiana.	Jeypore.
Do. do. E. Macdonald,	2d Bn. 24th N. I.	Lehargoan.
Do. do. John Lamb,	Maidan,	Malda.
Do. do. P. Halket,	1st Bn. 27th N. I.	Rajpootana Force.
Do. do. Wm. Hogg,	Hooghly,	Juanpore.
Do. do. George Lawton,	1st Bn. 5th N. I.	Delhi.
Do. do. Edward Muston,	Sarun,	Chupra.
Do. do. James Thompson,	2d Bn. 26th N. I.	Hansi Force.
Do. do. John Morrison,	Tirhoot,	Moozufferpore.
Do. do. J. J. Patterson,	2d Bn. 30th N. I.	Midnapore.
Do. do. R. Brown,	Doing duty 2d Bn. 8th N. I.	Left Division.
Do. do. George G. Spilsbury,	2d Bn. 15th N. I.	Cawnpore.
Do. do. Andrew Murray,	2d Bn. 1st N. I.	Centre Division.
Do. do. do. Harding,	Cawnpore,	Cawnpore.
Do. do. Chas. Renny,	Doing duty Artillery, Kurnal,	Left Division.
Do. do. John Allen,	1st Bn. 14th N. I.	Left Division.
Do. do. John Tytler,	Chumparun Light Infy. Bn.	Patna.
Do. do. Wm. Jackson,	2d Bn. 11th N. I.	Centre Division.
Do. do. Chas. Ray,	1st Bn. 28th N. I.	Left Division.
Do. do. A. Stratton,	1st Bn. 16th N. I.	Chittagong.
Do. do. John Gray,	Body Guard,	Oude.
Do. do. I. M. David-	Purnea,	Purnea.
son,		
Do. do. Wm. T. Webb,	1st Bn. 24th N. I.	Etsayah.
Do. do. Js. Watson,	Benares,	Benares.
Do. do. J. Smith,	Sylhet,	Sylhet.

NAMES.	APPOINTMENTS.	PRINCIPAL SEATS OF EXPERIENCE.
Co.'s Ast.Sur.W.Leslie,	Meerut,	Meerut.
Do. do. Alexr. Mac-		
lean, - - - - -	Commission, Cuttack,	Calcutta.
Do. do. Chs. Hickman,	Golur 'auze,	Centre Division.
Do. do. Thos. Haley,	Artillery, Agra,	Shajehanpore.
Do. do. T. E. Baker,	Garrison Asst. Surgn.	
	Buxar, - - -	Futtigurh.
Do. do. Thos. Stod-		
dart, - - - - -	Artillery, Benares,	Allahabad.
Do. do. Alexr. Garden,	Medl. Store keeper,	
	Nagpore Sub. Force,	Nagpore Force.
Do. do. C. E. Everest	Rcsy. Katmandhoo,	Napal.
Do. do. W. Gerard,	1st Bn. 26th R. N. I.	Bundlekund.
Do. do. John Row,	2d Bn. 29th Regt.	Hansi Force.
Do. do. G. N. Cheek,	Gya, - - - - -	Centre Division.
Do. do. C. S. Curling,	Pioneer Corps, 2d	
	Ceylon Vol. Bn.	Centre Division.
Do. do. C. B. Francis,	2d Bn. 9th N. I.	Mirzapore.
Do. do. John Grant,	2d Bn. 4th N. I.	Sumbulpore.
Do. do. Octavius Wray	2d Bn. 14th R. N. I.	Berhampore.
Do. do. H. Smith,	1st Bn. Artillery,	Saugor District.
Do. do. John Turner,		Burdwan.
Do. do. T. Henderson,	Juanpore,	Tipperah.
Do. do. John Adam,	Artillery, Nagpore	
	Sub. Force,	Chunar.
Do. do. Win. Dyer,	Doing duty 8th Div.	Hansi Division.
Do. do. P. Suter,	Gardiner's Horse,	Khassgrunge.
Do. do. Colin Mac-		
lachlan, - - - - -	3d Rohillah Horse,	Centre Division.
Do. do. M. Mendes,	Doing duty 2d Ro-	
	hillah Horse, - - -	Various.
Do. do. John Glas,	Bhaugulpore,	Bhaugulpore.
Do. do. John MacRae,	Chittagong,	Chittagong.
Do. do. Henry Young,	2d Purgunnahs,	Calcutta.
Do. do. George Bal-		
lard, - - - - -	Bauleah,	Bauleah.

## INTRODUCTION.

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IN attempting to write a description of the Epidemic, which has of late so severely afflicted the Continent of India, it may not be amiss to give some account of the Weather, which preceded its appearance ; in order, that it may be seen, in what respects it differed from that usually prevalent during similar periods of former years ; and how far the general insalubrity of the air, was fairly attributable to such difference.

It must be confessed, that researches of this nature have hitherto proved but little satisfactory. Long experience has shewn, that the noxious qualities of the atmosphere, giving rise to epidemics during particular seasons, can rarely, if ever, be traced to any irregularities in its manifest and sensible properties ; and the enquiries of the most sagacious observers, in matters of so abstruse a nature, have generally terminated in an honest confession of their ignorance, or in a poor endeavour to conceal it under some specious, but unmeaning name.—Hence, among the

ancients, those wild speculations regarding the untoward influence of the heavenly bodies ; the malignant conjunction of the planets ; and the too near approximation of a comet to our globe ; which easily gained credit with the simplicity of the darker ages. Hence, too, the theories of an undue distribution of the electric and magnetic fluids ; of a latent alteration in the bowels of the earth ; of the distant agency of volcanic eruptions, and earthquakes ; and many others equally visionary, with which it has been attempted to appease the curiosity, and relieve the suspense, of these more enlightened days.

But, as it is only by the accumulation of large bodies of facts, that we can expect to arrive at any satisfactory conclusions in matters of science ; and as the seasons, which we are about to describe, were certainly diversified by very unusual irregularities ; we should scarce be justified in passing them over, entirely unnoticed. It will still be left to the reader to determine in his own mind, what connection they had with the subsequent sickness ; and what influence, if any, they exerted upon the rise and progress of the Epidemick. Before describing the nature of these irregularities, it will be necessary, for the sake of subsequent comparison, to premise a few words on the kind of Weather usually prevalent throughout the year, on this side of India,

In Bengal, and in the Central and Northern Provinces of Hindostan, the seasons, obedient to the course of the sun, generally succeed each other with an undeviating regularity, quite unknown in the variable climates of the old world. Taking their names from the quality, which peculiarly characterises their march, they have, by common acceptation, been divided into the COLD, the HOT, and the RAINY season.

The Cold Season commences with November, and ends in February.—About the middle of October the weather begins perceptibly to change.—The days are still oppressively hot; but the mornings and evenings gradually become cool. The wind, which during the preceding months had blown generally from the South and East, now begins to come round to the West and North; and to carry along with it the heavy masses of clouds, which almost constantly float about, and obscure the horizon, during the whole of the Rains. The atmosphere, from being very damp and watery, grows dry and elastic; and the heavens begin to brighten a little. But these appearances are not yet uniform; the sky still at times becomes gloomy and overcast; and heavy showers, accompanied by thunder and lightning, shew that the South East Monsoon has not yet finally taken its leave.

In November, the weather becomes delightfully fair and pleasant. A cold sharp wind now blows steadily from the North. The air is dry, clear, pure, and serene ; the vault of heaven is of a beautiful deep azure colour ; and in general not a cloud is to be seen. The nights are clear, with heavy dews. The Thermometer\* in the shade ranges throughout the month from 66 to 86 ; the mean heat about 74 ; medium altitude of the Barometer 29. 98.

As December comes on, a considerable change takes place. Although the middle of the day, and the afternoon, be clear and fine ; a haze generally towards evening collects round the horizon ; and obscures the setting sun. As the night advances, thick fogs, sometimes general, sometimes partial, begin to collect ; and do not disperse until morning. As they are broken up by the influence of the sun's rays, their vapours rise and form grey masses of clouds ; which render the early part of the day hot and unpleasant, and do not disappear until it is far advanced. These fogs do not by any means occur every night. Sometimes, though rarely, the whole month passes over without them ; ordinarily they appear only three or four times ; sometimes during

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\* Throughout this Essay the thermometer is spoken of only in the shade.

several nights successively. As in November, the North and West are the prevailing winds. They are very sharp, but blow steadily, never rising to a gale, nor falling to a perfect lull. The range of the Thermometer is from 56 to 78; the mean temperature about 70; altitude of the Barometer 80. 01.

During January much the same weather prevails. The air is serene and piercingly cold. The wind blows steadily, and perhaps more forcibly, from the North and North-west than in December. Fogs are still very frequent, and sometimes so thick, that scarcely any object is visible until a late hour of the morning; and every thing exposed to the external air becomes wet, and covered with drops of moisture. They may often be seen rolling in large dense bodies in opposite directions. During the clear nights, heavy dews fall. The range of the Thermometer is from 47 to 75; the mean heat about 68; altitude of the Barometer 29. 99.

The weather keeps very pleasant until the second week of February; when the middle of the day grows warm; and the change of the wind to the South and East, and the collection of clouds in the horizon, with threatenings of thunder gusts, portend the approach of the Hot

Season. At night the air is raw and cold ; and the mornings are foggy. The Thermometer ranges from 65 to 82 ; the mean heat 76 ; altitude of Barometer 30. 3.

Sometimes, a few heavy and refreshing showers fall about Christmas ; but the whole of the Cold Season is generally marked by the total absence of rain. It is remarkable how invigorating the cold bracing wind of the North, and the pure elastic air, and clear sky of these months prove to the European constitution : harassed and broken down by the previous long continuance of moist and oppressive weather. The appetite and strength, which had long before failed, now return ; and the whole frame becomes light and springy. Vegetable nature partakes of the generally salubrious effects of the season ; and garden plants and exoticks, at all other times killed by the excessive heats, now grow with freshness and vigour.

The Hot Season may be considered to set in fairly with March. The sun now becomes very powerful ; and the days are warm and even hot. They are, however, prevented from being oppressive by the strong and steady winds uniformly blowing from the South. Fogs are yet not uncommon in the mornings ; and as they

clear up, go to the North to form, with the thick, dispersed, masses of clouds, that are constantly drifted along the horizon by the wind, materials for the approaching storms. These storms, which by the inhabitants are termed NORTH WESTERS, do not however, generally occur till towards the middle and end of the month. They are usually preceded during several days by cloudy mornings, and strong gales. Then for one or two evenings comes on distant thunder, with strong gusts of wind, but without rain. Towards the afternoon of the day in which the storm is to occur, the wind, which during the morning and forenoon had been continued and boisterous, begins to fail, and at length settles into a dead calm. The air becomes oppressively sultry. The clouds gather in the North West ; and form a deep, dense, lowering, bank. Vivid lightning, accompanied with heavy thunder, and gradually advancing nearer and nearer, indicates the immediate approach of the storm. At length, the calm is suddenly interrupted by a tremendous burst of wind, and by clouds of dust, which darken the horizon. Then follow torrents of rain, with close and heavy thunder ; and these are soon succeeded by a serene sky, and cool air. The appearance however, of these sudden commotions is not always the same—sometimes a shower of hailstones precedes, or comes in

the place of the heavy fall of rain ; sometimes there is no rain, even when the fury of the wind, and quantity of the lightning are excessive. The general time of their coming on is about sun-set ; they rarely occur earlier than six in the afternoon, or later than midnight. When the days keep clear, and the wind moderate, heavy dews fall at night ; but in blowing weather, there is no dew : the moisture as it settles, being carried off by the wind. Range of the Thermometer from 73 to 86 ; mean temperature 79 ; altitude of Barometer 29° 86 : the fall in the mercury being ascribable to the prevailing high winds, and increasing rarefaction of the air.

April has generally blowing weather throughout. The prevailing wind is still the South. The atmosphere is sometimes clear, generally hazy, with much dust, and thick loose clouds continually moving to the North. The weather is hot, but pleasant, till towards the end of the month ; when the nights become close and sultry. The general closeness however, is from time to time relieved by thunder storms, and seasonable falls of rain. The wind usually becomes hot to the feel about the 20th ; and so continues to the end of the succeeding month. Range of the Thermometer from 78 to 91 ; mean heat 84 ; Barometrical altitude 29. 75.

May is the most disagreeable month in the year. In the commencement there is high wind at times; but during the greater part of the month the weather is exceedingly close, still, and oppressive. The nights especially are sultry. There is little or no wind in the mornings, which are thick and hazy, with low, gloomy, scattered masses, of clouds. But as the sun rises, a breeze springs up from the South, and keeps gradually freshening until the evening, when it again fades away. The air is hot, but inelastic; and as it does not carry off the perspiration, leaves the body moist and clammy. The dejection and lassitude now universally produced by the great-heats, are however fortunately removed by the frequent recurrence of violent North-westers, with their usual accompaniments of thunder and rain. There are no fogs during April or May. The Thermometer ranges from 81 to 93; mean heat 86; Barometrical altitude 29° 60'.

In some years, but not always, nor even generally, between the 15th and 25th of the month, the horizon becomes overshadowed with dark-thick clouds from the South East quarter; and much rain falls during several days; constituting what are called the LESSER RAINS. But more commonly, the close muggy weather continues

with little interruption, until the end of the first, or the beginning of the second week of June; when the veering round of the wind towards the East; the occurrence of thunder in the evening; and the constant cloudy state of the atmosphere, indicate the approach of the regular RAINS. These commence from the 4th to the 18th of June; and continue with frequent variations, during the four following months. At first, they set in with thunder showers, sometimes heavy, sometimes light, generally from the South and East. Then follow several days of very heavy rain; during which the sun is completely hid from view. Then there is a shew of fair weather, with sunshine, and beautiful clear nights; but this is of very uncertain duration; and liable to be interrupted with scarcely any previous warning. The heavy rain rarely keeps up for more than forty eight hours at a time; then gradually diminishing to drizzling, and at length giving way to fair weather. There is at frequent intervals, during the whole period of their continuance, much vivid lightning; with violent thunder storms, and strong gusts of wind. The wind frequently changes, from East, to South, and West: rarely to North. Its return to the East, and fixing steadily in that quarter, is usually accompanied with heavy rain.

"As soon as the Rainy Season has fairly come

mènced, the atmosphere becomes manifestly cooler; and the weather in general very pleasant; the only exceptions being now and then a sultry night; and the dead oppressive calm, which sometimes precedes a storm. From the dust and other particles floating about in the atmosphere being carried away by the successive showers, the sky during the intervals becomes beautifully clear; the sun shines with great splendour; and the nights are bright, with innumerable stars. There is very little variation of the atmospherical temperature throughout the season. The Thermometer ranges from 77 to 88 or 90; the mean heat being 81, or perhaps a degree or two higher. The air from the constant rain becomes surcharged with moisture; and every thing exposed to it gets damp and mouldy. There is consequently little alteration in the Barometer. The mean altitude is about 29: 45. It is higher at night than in the morning, and lowest at midday.

In September the Barometer is observed to rise a little; but there is little perceptible change in the weather, till the middle of October. The rain then begins to abate. The showers are fewer in number; and though heavy, of short duration. The wind gets very variable. There are still frequent shews of thunder and light-

ring; but they generally pass off without producing rain. The days are yet sultry; but the mornings and evenings begin to grow cool; and the increasing clearness and elasticity of the air, with the coming on of dews at night, presage the speedy accession of the COLD SEASON. At length the veering round of the wind to the West-north-west quarter, the disappearance of clouds and vapours from the horizon, the sharpness and dryness of the air, the rapid rise of the Barometer, and concomitant fall of the Thermometer, towards the end of the month, evince the entire departure of the Rains. The total quantity of rain falling during the season varies much in different years. In Bengal the average has been fixed at 70 inches.

The effect produced upon the face of nature, by the change from the destructive heats of April and May, to the refreshing days of June, is immediate and striking. The whole of the vegetable kingdom, which had drooped during the previous long drought, is brought into speedy and active life; and the ground, from being parched and bare, is soon covered with a luxuriant carpet of green. The animal kingdom shares in the favorable revolution; and all space is filled with myriads of insects, just called into existence. The rivers, wells, and tanks are spec-

dily filled to their margins. In the lower parts of Bengal, the face of the country is soon covered with water; often to such depth, that a passage may now be made in boats between places, which during the cold and hot season lay high and dry.

So much has been already written upon the diseases endemic in this climate, that it will be sufficient for our purpose, merely to enumerate their names; and to specify the seasons, in which their several species are most prevalent. The Cold Weather brings with it the ailments usually produced by marked alternations of heat and moisture; and Cattarhs, Intermittent Fevers, Rheumatisms, and Diarrhoeas are then common. The Bilious Remittent Fever comes on with the great heats of April and May, and predominates till August and September; when it gradually gives way to Bilious Dysentery and Bloody Flux. Acute Inflammation of the Liver is met with in all Seasons, but is perhaps most common in the early part of the Rains. Besides many disorders common to it with other climates, Bengal is in a particular manner noted for the production of Enlarged Spleen, and other distressing diseases; which however, as being of a chronick and sporadic kind, it is hardly to ~~out~~ present purpose to mention.

It will be observed, that the foregoing notices are more applicable to Bengal and the Lower Provinces, than to the central and upper parts of India. In the latter, the seasons are considerably modified. The Cold Weather begins earlier, and ~~lasts~~ longer; and is far more sharp, dry, and invigorating. It is very rarely accompanied with fogs. Throughout the Hot Months, the wind during the day and earlier part of the night blows strongly from the West; and is so dry and fiery, that it parches up the whole country. The Rains set in late, and though sometimes vehement whilst they last, are of shorter duration.

The changes which have taken place in the course and succession of the Seasons within the last few years in every part of Bengal, and its dependencies, have been so striking, as to have not merely attracted the notice of attentive observers, but to have become a frequent topick of common conversation. In noting the nature of these deviations, it will be necessary to begin pretty far back.

In the year 1815, a RAINY SEASON, marked by an excessive fall of rain, great inundations, and the bursting of the Ganges, Soane, and Coossee rivers from their beds; was succeeded by a damp, unpleasant COLD WEATHER, with unusually frequent dense fogs in December and January.

The following HOT WEATHER was remarkable, for the late and scanty appearance of the usual thunder storms; and consequent great heats and drought. Although several North Westers occurred during April and May, they were very partial in extent; and generally unaccompanied with rain. On the 15th of April 1816, a little before midday, a shock of an earthquake was felt in Calcutta. Towards the end of May, the weather had become so oppressive, that the Thermometer sometimes rose as high as 98; an unusual height in Bengal; and many individuals, both Europeans and Natives, dropped down dead in the streets.

Much the same kind of weather was experienced in the Upper Provinces. A severe Cold Season, followed by excessive drought, gave rise to great sickness amongst the Natives; and by destroying the spring (*Rubbee*) crop of grain, prepared for the succeeding general scarcity.

In the Lower Provinces the dreadful sultry RAINS. weather continued until the 14th of June, when JUNE. the RAINS commenced. They kept up moderately in Calcutta and its vicinity, during the latter part of June, and the whole of July. A second JULY. shock of an earthquake was on the night of the

August.

September.

11th July, felt slightly at the Presidency, and more perceptibly at Moorshedabad. Towards the latter part of August, and the beginning of September, the rain became exceedingly scanty, and the days and nights oppressively hot in Calcutta; and in the western parts of the province of Bengal, the drought was so uncommon, as to dry up the rivers, and give rise to apprehensions for the safety of the rice crop. Then, about the end of the first week of September, this unwonted drought gave way, and was succeeded by very heavy rain, which lasted all the month, and caused a greater and more general inundation than had occurred within the recollection of the oldest inhabitants,

The effect of these sudden and unusual extremes, was very discernible in the unwholesome condition of the atmosphere then present; and in the kind of the prevailing complaints,

Instead of acute dysentery, and the other inflammatory diseases generally predominant at this period, it was remarked by the medical men, that the only cases falling under their notice were low fevers, and other disorders of the typhoid type. Of this a remarkable proof was exhibited in the occurrence of infectious Malignant Sore Throat: a disease previously known only by name in this quarter of the globe.

In the Upper Provinces, the extraordinary <sup>Upper Provinces.</sup> scantiness of the Rains was yet more remarkable ; and was attended by more deplorable results. In the month of July a few "showers fell ; but they were partial and of short continuance. More generally, from Benares upwards, — Oude, the Districts within the Dooab, and those west of the Jumna, were dried up by the long continued and unceasing heats. The parching westerly wind kept blowing throughout August, and the first fort-night of September. Not a shower fell ; and so excessive was the heat, that *tatties* were in use at Futtighur, Coel, and other stations, during the whole of this period. Since 1803, the memorable year of the commencement of Lord Lake's campaigns, no such season had been experienced. As in Calcutta, and about the same time; this long period of drought was succeeded by heavy and incessant rains for many days ; and the whole face of the country was laid under water.

It was not to be expected, that so great a deviation from the common course of nature, and such extraordinary and sudden extremes, should prove wholesome to the human constitution. We accordingly find, that the sickness, before stated to have crept in amongst the Natives, had now become general ; and, before the end .

of August, was raging epidemically in almost every town and city between Patna and Saharunpore. It exhibited itself in the shape of a bilious remittent fever, of a violent inflammatory type; accompanied, like the yellow fever of the West Indies, with suffusion of the skin; and, unless cut short in the commencement by bleeding and other powerful auxiliaries, rapidly running its course; and in spite of every remedy, terminating fatally at the end of two or three days.—The width of its range precluded the possibility of its being referred to any causes purely local; and that it was not kept up by infection alone, was proved by the indiscriminate nature of its attacks. It seized equally Europeans and Natives; and as readily entered the open and spacious house of the Officer and Civil Servant, as the crowded barrack of the Soldier, or low filthy hovel of the Native.—The mortality produced by it in Delhi, Saharunpore, Futtighur, Benares, and other large Cities, was very great. In Delhi, of two Natives Corps alone, there were five hundred men at once sick in Hospital. In Dinapore, and at Ramnuggur, the troops suffered severely. Of the European Flank Battalion, 648 strong, stationed at Allahabad, 305 men were attacked during October; early in November there were at one time 180 rank and file, and twenty women and children, on the sick list; and

in the whole, only 70 men of the seven Companies of which the Corps consisted, escaped the disease. But Cawnpore was the principal seat of its ravages, amongst Europeans.—Of four King's Corps, the 24th Regiment of Light Dragoons, 735 strong, and the 14th, 66th and 87th Regiments of Foot, 852, 813 and 702 strong, then in cantonments, there were from first to last nearly 1000 persons taken ill.—The disease here began in August, prevailed during the three succeeding months, and did not finally withdraw until the setting in of the Cold Weather in December. It was at its height in September and October. Eight or ten, and sometimes even fifteen men, then died daily. The 87th and 66th Regiments suffered dreadfully. From the time of their reaching the station they lost nearly four hundred men. The former corps is stated to have had 519 in Hospital at once; to have buried 21 persons (including women and children) in one day, and upwards of 90 of its number within a month. This is a degree of mortality, far exceeding any thing then on record in the medical annals of Bengal.

The effects produced by so unparalleled a state of sickness will be best understood, from the following description written at the moment. “ The stations chiefly affected wore a gloom, hardly to

be conceived at the commencement of the Cold Season. Every family was suffering in some of its members. All social intercourse was interrupted; and the only communication between separate families, consisted in visits of condolence and consolation. Of numerous Native villages, nearly the whole population was ill at one and the same moment; and many of the shops were shut for want of people to attend them. The banks of the river were covered at all times with the dead and the dying: such had been the ravages of this dire distemper.—” It has been stated, that the disease abated in December. So early as the end of November, its attacks had become less frequent, and its symptoms milder; but relapses were still common; and it was very difficult to counteract the extreme debility invariably consequent on the attack,

November.  
December.

A similar mortality, preceded by great scarcity of grain, prevailed about the same time in Cutch, Sindh, and the other States bordering on the western side of India. By the natives it was ascribed to the plague, and said so to have depopulated several cities, that the living were unable to bury the dead.—Throughout Upper Hindostan, it was observed that horned cattle were very sickly at this period. Their bodies could be seen strewed in vast numbers in the pastures, by passing travellers.

If it should be thought, that the general sickness characterising this period has been too long dwelt upon, as being different in kind, and therefore unconnected with that marking the following year; it must be remembered, that all that is attempted to be proved in this essay, is the existence of a distempered state of the air, in all probability dependent on the irregularities of the season previously to the breaking out of the great Epidemick; and, that it is only by the patient investigation of minute details, we can hope to discover the causes producing the difference in the vicious constitution of the succeeding years.

The ensuing Cold Season, both in the Lower and Cold Season. Upper Provinces, was raw, damp, and unpleasant; and throughout cloudy, with frequent falls of rain.

In Calcutta November was marked by unusually frequent fogs; succeeded by warm days, and light variable winds.\* During the month there were nine foggy mornings. Two days were cloudy; the remainder clear.—The Thermometer generally ranging between 70 and 77 at 10 A. M.

In December the same kind of weather prevailed.—There occurred sixteen foggy nights; on two occasions five nights in succession.—The days were still warm, and clear; with moderate breezes from the North and West.—Range of the Thermometer from 66 to 71.

1817.

January.

The early and middle parts of January were cool and pleasant, with fewer fogs than in the former months.—The prevailing wind was northerly, with more clear than cloudy days; and the Thermometer stood much as in December.—On the 28th, light winds chiefly from the South, with very thick fogs, and sultry days, supervened, and so continued the rest of the month. .

February.

The singular deviations from the ordinary course of the seasons, which marked the remaining part of the year, now began; and February had much more the appearance of an autumnal, than of a cold weather month;—for it commenced raining heavily on the night of the 1st; and so continued every third or fourth day till the end of the month. A reference to the annexed Tables will shew, that it rained excessively on the 1st, 2nd, 4th, 11th, 18th, 20th, 21st and 22nd. The remainder of the month was cloudy; with high winds from the North and East. There were two foggy mornings.—The Thermometer fluctuating from 67 to 73.

March.

March differed from the preceding month, only in the frequency of thunder storms, during nearly its whole course. Much, and very heavy rain, still continued to fall; and there was a constant alternation of cloudy and clear weather,

with winds varying greatly in strength, and latterly almost always from the South. On the 21st, there was an exceedingly violent thunder and hail storm, followed by torrents of rain; which greatly injured the spring grain crop, and the new sown Indigo lands, and destroyed the blossom of the Mango, and all other fruit trees then in bloom.\*—The air, though cool, was raw and unpleasant.—Thermometer from 68 to 82.

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\*The same kind of weather obtained during the whole of the season all over this side of India; and from Loodianah to the Presidency there was scarce a district or village in which the prospects of the (*Rubbee*) harvest were not blasted by heavy falls of rain, and long continued humidity of the atmosphere.—The following extracts from a meteorological journal kept during a journey by water from Allahabad to Calcutta, will shew, that the Middle Provinces by no means escaped the general dreariness of the season.—February 4th, Jumna Ghaut, Allahabad. Morning cold and misty: wind South East. Temp. 55 at sun-rise, 71 at 2 P. M.—Off Benares. 9th, little wind easterly and cloudy.—11th, above Ghazepore.—Wind fresh from the East; day gloomy, cloudy, raw, and uncomfortable.—12th, Ghazepore. Morning misty, raw and cold; day close and cloudy; little wind, chiefly from the South.—13th, Buxar. Very little wind, variable. Temp. becoming higher; at sunrise 63, at 3 P. M. 76; slight exertion produces perspiration.—14th, strong wind veering from North East to North West; much rain.—15th, a great deal of rain during the last evening and night, which

There was nothing remarkable in the diseases of this period.—Europeans and Natives were now generally uncommonly healthy.—Among the former, chronic dysentery and rheumatism, were the prevailing complaints : on the 30th, however, an European soldier belonging to His Majesty's 59th Regiment, then in Garrison at Fort William, was attacked by Cholera Morbus, and in spite of every remedy, died in thirty-six hours.

April was generally cloudy, with strong southerly winds, and frequent thunder storms and North Westers; in this resembling the regular appearances of other seasons more than any preceding month.—On the 18th there was a heavy

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were very disagreeable. Now cloudy with little wind.—16th, morning foggy, cold and raw; wind N. N. East.—18th, Dinapore. Lightning, thunder and rain yesterday evening; now cloudy and calm.—19th, Patna. Rainy, stormy, raw, and cold; Temp. 61 at sun-rise, 66 at 3 P. M.; wind E. N. E.—20th, Violent wind and much rain; cloudy and cold.—23d, Monghyr. Thunder, lightning, and rain.—25th. Cold, raw, wind from North East.—26th, Rajmahel. Rainy, cold, and disagreeable; wind South East.—March 2d. Muttabhunga. Rained incessantly since six this morning; day very cold, gloomy and raw; wind fresh, South East.—3d. Rained and blew all night; cloudy and disagreeable.—4th. Morning foggy; Temp: 56.—5th. Morning foggy and raw.

fall of rain ; and from that time to the end of the month, the air was dry, and mostly clear. The weather was uncommonly cool till the 27th : the Thermometer not having once risen higher than 85. On the 27th the heat was 91 ; and it kept up to nearly the same point during the three following days. A few cases of fever occurred, especially among new comers, about the middle of the month ; but generally there was yet very little disease in the Settlement.

The first week of May was hot ; sometimes May. with little wind. On the 3rd there was a strong gale, with rain from the East ; on the 5th a Northwester ; and on the 6th more rain.—During the two following weeks nothing extraordinary occurred ; the Southerly winds kept blowing moderately, with frequent showers.—On the 17th there was a strong gale, with rain from the South East ; followed by cloudy weather, which brought on a severe Northwester in the evening of the 24th. Up to this period the air was cooler than usual to the feel ; although the Thermometer generally stood at 82 at sun-rise, and 90 at 3 P. M.

On the 25th of this month, at least fifteen or twenty days earlier than ordinary, the rains set in ; and there was almost continual rain, with variable winds, close weather, and heavy clouds

till its close.—As yet there was no interruption to the previous healthiness of the city.—Slight fevers, and bowel complaints filled up the sick list; and hardly an instance of hepatitis came under notice.

June.

From the 4th of June to the close of the month, there was scarcely a fair day; on many days the rain poured incessantly in torrents; and the season now began to be reckoned a very wet one. The rivers became high, and the tanks were already filled with water.—The mornings got cool; and the heat of the day moderate.—Thermometer ranging from 78 to 86; steady Southerly winds, without storms or thunder and lightning. Fevers still continued to prevail moderately; with dysentery, and now and then a case of hepatitis.

July.

In July there was hardly a dry day.—An immense quantity of rain fell; and before the end of the month the river was quite full, and the country nearly under water.—The sky was almost constantly cloudy; the atmosphere generally cool and pleasant; at times close and sultry.—Thermometrical range from 80 to 87; medium heat 83:38; winds variable, generally moderate.—The prevailing diseases, although still of unusually limited extent, now became more severe; requiring more active treatment than be-

fore.—To fever, hepatitis, and flux, acute rheumatism was now added, and proved rather troublesome,

From the 1st to the 10th of August excessive-<sup>August</sup>ly heavy and almost incessant rain continued to fall; on the 8th, 9th, 10th and 11th, it poured in torrents, and without interruption.—The weather was generally cloudy and calm, with South Easterly winds; temperature rarely higher than 85; often as low as 81.—The middle of the month was hot and oppressive; and the nights sultry, and exceedingly disagreeable.—The Thermometer then fluctuated between 81 and 87; and there was little wind, generally South West. From the 22d it rained every day, but except on the 31st not very heavily, till the close of the month; with variable winds, mostly from the South and East.

Amongst Europeans the only complaints yet noticed were slight fevers, severe cases of Dysentery, and hepatitis; but the Natives now for the first time began to suffer severely from the Epidemic Cholera.

In the early part of September, the weather<sup>September</sup> continued close, sultry, and unsettled, with frequent showers; but previously to the 7th the water in the tanks had fallen nearly a foot: a clear

proof, that the general body of rain given out by the clouds was now beginning to diminish. There was much rain, with variable winds throughout the remainder of the month.—From the 16th, although the days kept hot, the mornings began to get pleasant; and the atmosphere at times to be freed from clouds; so that in the middle and latter part, there were several clear days, with bright sun, and consequent great evaporation.—The mortality had now become exceedingly great, amongst the Natives, and was no doubt increased by this, amongst other causes.\* On the 28th there was a fog. At this period there was no remarkable variation in the atmospherical heat. The Thermometer ranged from 82 to 89; at sunrise it generally stood at 84.

The usual endemic diseases, fever, flux, and hepatitis, were this month rather common. The fevers were generally slight, seldom needing the lancet.—The dysenteries were, as is usual in hot climates, mostly connected with inflammation in the liver; and sometimes terminated in abscess

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\* On the 15th of this month the existence of the Epidemic in Calcutta, was first officially brought to the notice of Government, in a letter from the Chief Magistrate; and the disorder stated to be raging with extreme violence, especially in the low parts of the Town and Suburbs.

of that viscus, and consequent death. Upon the whole it was observed, that in Calcutta, from the commencement of the preceding hot season, until the end of August, there was less sickness, especially amongst Europeans ; and that the symptoms of the disorders principally attacking them, were milder, than during similar periods of many preceding years.\* Was this ascribable to the low temperature then generally prevalent ; and to the humid and cloudy state of the atmosphere proving congenial to the European constitution, from its approximation to the cold and raw climate of European countries ?

Several cases of Cholera occurred amongst Europeans on the 5th September ; and from that day forward, the disease became daily more frequent. Why it reached them at this peculiar moment, cannot be discovered from the most accurate scrutiny of the meteorological observations for that period. From these it appears, that the first three days of the month were cloudy, with showers, and moderate breezes, from the

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\* How little the general health of the European inhabitants suffered, is proved by the returns of his Majesty's 59th Regiment. This corps averaged throughout the year 582 ; its deaths were 16, or 1 in 36 $\frac{1}{2}$ ; an exceedingly small proportion, speaking favorably both of the climate and of the interior economy of the Regiment. Of the deaths only two were from Cholera. From this disease however, they suffered severely next spring.

South East ; and that from the 4th to the 14th, the weather was constantly rainy ; with fresh gales from the same quarter. And the fluctuations of the Barometer and Thermometer were during the whole time so small, as scarcely to deserve being noted down.

October.

The weather kept unusually close, stagnating, and oppressive, during the whole of October. In the early part of the month, there was little wind, generally from the South ; with an atmosphere sometimes cloudy, sometimes clear ; frequent showers, and occasional heavy falls of rain : the Thermometer ranging from 82 to 88. From the 9th to the 17th there was a glimpse of fair weather, with light variable winds, and mostly clear sky. Then, late on the day of the 17th, the wind changed round to the North East ; and blowing hard, brought from that quarter a deluge of rain ; which lasted without a moment's cessation for twenty-seven hours ; again filled the tanks ; and laid the face of the country under water. The reduction caused in the atmospheric temperature by this change was sudden and great. The Thermometer at once fell from 87 to 71 ; and during the 18th and 19th did not again get higher than 74. On the 19th the wind returned to its usual station in the South ; and from that day forward to the end of

the month, there was an unusually watery, cloudy, atmosphere; with little rain: the Thermometer meanwhile ranging between 78 and 86; and the weather proving sultry and disagreeable. Excepting that Cholera had become more frequent, there was no remarkable difference between the disorders of this and the preceding months. Perhaps acute dysentery and Rheumatism were more frequent.

The weather should now, according to the November common course of things, have become cool, settled, and fair; but the continuance of a cloudy sky, and of unwonted humidity and warmth in the air, and the frequent recurrence of rain throughout the month of November, proved, that the remainder of the year was to proceed with the same strange unseasonableness, and insalubrity, which marked the early parts of its course. The wind getting round to the West, a good deal of rain fell on the 4th and 5th; attended by a considerable fall in the mercury. The days were then pleasant, with variable winds, and sky, till the 23d; when a ~~storm~~ came on from the North West, and was followed by a heavy fall of rain. The Thermometer, which had hitherto ranged from 71 to 81, now sunk several degrees; and did not again go beyond 74, during the remainder of the month.

The last week of the month was distinguished by very cloudy weather; with North Easterly winds, rain on the 29th, and a thick fog on the 30th.

Bilious fever, requiring bleeding, was common in the early part, and intermittents in the end of this month. Fluxes prevailed throughout; and were sometimes severe. The diminution in the atmospherical temperature, which took place in the early part of the month, was probably the occasion of the returning comparative healthiness of the city, noticed at this period. On the 10th we find it stated, in a publick letter from the Medical Board to Government, that the Epidemick was beginning to give way to the favorable change in the season; and the official returns shew, that the disease, from that time until the middle of the succeeding February, although still alive, was in a very languishing state.

Before proceeding further in this sketch, it will be useful to advert shortly to the state of the weather during the foregoing period, in the other districts of Bengal, and in Upper India; in order that we may see, whether in them the regular procession of the seasons was equally interrupted, as in Calcutta, and its immediate vicinity.

In the districts of Jessore, Backergunge, Nuddeea, and every other portion of the Gange-tic Delta, there had been a long protraction of very heavy rain ; and nearly the whole country, especially in the lower division of the province, was one sheet of water before the middle of August. In Nuddeea the whole year had been rainy, and damp. Rain fell in eight different days in February ; and four in March. In every week of April and May, there was a succession of thunder storms and rain. The river began to rise in May ; much earlier than usual. The Rainy Season was extraordinarily wet. Lakes and tanks, which, in former seasons, remained dry a great part of the year, soon filled ; and kept so for a long time. It was calculated, that in the whole, 120 inches of water fell. In the Eastern division of Bengal, the season wore a different appearance. In the Dacca district, the rains were confined to June, and the first ten days of July. Hardly a drop of rain fell in August, and September ; usually very wet months. The inundation from the river was four feet short of its usual height. The same irregularity obtained in Sylhet, and the other tracts washed by the tributary streams of the Burumpooter. From the end of August not a single shower occurred till the 5th of October, when torrents poured.

In the Middle Provinces there was nothing very peculiar in the progress of the Rains ; but in the districts of Cawnpore and of Bundelkund, and generally throughout Upper India, they were observed to be remarkably scanty.

December.

We shall now return to the regular course of our observations on the season at Calcutta. Throughout December, it was clear, pleasant, and cool weather ; but warmer than it ought to have been at that period of the year. Rain occurred on the 1st ; and fog on the 28th ; and the rest was serene. Winds generally Northerly, and moderate ;—Thermometer varying from 61 to 76. To the complaints of the preceding month, were now added agues and diarrhoeas ; but they were not violent or numerous.

1818.  
January.

Of the succeeding year, January had an alternation of cool and pleasant, with close and hot weather ; generally clear, with light Northerly winds. It was foggy on the 11th, 20th and 30th ; and there was rain on the 17th and 31st. The Thermometer ranged from 62 to 78. The dews at night were very heavy. During the four last days, the weather was warm ; with Southerly wind and cloudy sky—Nothing remarkable in the complaints prevailing during the month.

The first part of February was cool and clear, <sup>February.</sup> with moderate winds, chiefly from the North and West; and frequent thick fogs. From the 19th the wind settled in the South; the Thermometer rapidly rose from 70 to 80; and the Hot Season might then be said to have set in. On the 25th there was a North Wester; and on the 27th and 28th much rain. This sudden change about the 20th of the month, is worthy of particular notice; because it was at this very time, that the Epidemick, after dying away in November and December, and being nearly extinct during January, again took head; and amongst the Natives raged with indiscriminate violence, until the end of the following July. It now attacked Europeans and Natives with equal readiness; and as if it had gained fresh malignancy, by lying for a time dormant, did not so readily yield to medicine as before.

March, like its predecessor in the former year, <sup>March.</sup> was marked by very uncertain and unseasonable weather. Up to the 12th, the winds were variable, Northerly, West and South Westerly; generally moderate. The atmosphere partly clear; partly cloudy and hazy; with much rain on the 4th, 5th, and night of the 6th; and the temperature mostly 70 at sun-rise, and 76 at noon. On the 12th, the wind set in steadily from the South;

and at 3 o'clock of that day the mercury rose to 87. On the 15th there was a thick fog; on the 17th fog; on the 18th, 19th, 20th, 21st, 22d, 23d, 26th, 27th, 28th, and 29th much rain; with strong gales mostly from the South and West. On the evening of the 28th, it blew a hurricane from the same quarter. There was fog on the mornings of the 25th, the 29th, and the 31st; with Northerly wind during the latter day. During this time the Thermometer fluctuated, at sunrise between 74 and 80; at 3 P. M. between 80 and 88. There was much general sickness in this period of great irregularity. Bowel complaints were especially frequent. The Epidemick was now more common than ever amongst Europeans; and fresh cases were every hour pouring into the hospitals.

## April.

The early part of April, was cloudy, with frequent strong gales from the South East; and warm unpleasant weather.—There was a North Wester on the 4th: the only one during the month.—Rain fell on the 4th and 13th. About the 15th the wind settled steadily in the South; and blew hot from that time to the end of the month.—The Thermometer fluctuated between 80 and 89.—The diseases of this month were generally mild; few fatal cases of Fever; some of Dysentery.—The Epidemick had now declined among Europeans.

There was a great deal of close hot weather in May; with Southerly winds and cloudy sky throughout; and several storms, without rain from the North West.—A shower or two fell about the middle of the month; but these did little to lessen the temperature of the air; and the nights and mornings kept close and sultry, with a foul, hazy, atmosphere.—The Thermometer varying from 86 at sun-rise, to 92 at 3 P. M. The prevailing complaints were much as in the former month; except that acute Dysentery was unusually frequent for the season of the year.

The RAINS set in early in June.—As the weather now began to get more steady and regular in the vicinity of Calcutta; and as from this time the seasons, after so long a period of extraordinary deviation, seemed inclined to return to their ordinary course; and to abide by the laws marking their natural progress and succession; the reader need no longer be harassed by a dry detail of the varieties of each succeeding month. It will be sufficient to state concisely their general appearances; referring him for particulars to the annexed Tables. The Rains were seasonable and pleasant.—An average quantity of rain fell during June and July; in August and September the quantity was perhaps in excess. But during the whole period, it was distributed with much equality; so that there was neither

May.

June.

July.  
August.

September.

October.  
November.  
December.  
1819.  
January.  
  
February.  
March.  
April.

deluge, nor long continued drought.—Early in October the weather cleared up; and gradually gave place to the Cold Season; which was mild in the beginning, moderate in the middle, and unusually cold towards the conclusion. Then came, rather suddenly, a fortnight of unexpectedly warm weather in February; succeeded by a hot month of March, with frequent fogs, few North Westers, and hardly any rain.—April was, on the contrary, unusually cloudy; with frequent storms, heavy rain, and strong gales from the South East and North East; hot unpleasant days, and cold chilly nights.—Thermometer ranging from 76 to 86.—The 7th, 8th, 11th, 17th, 18th, 19th, 21st, 22d, and 23d, were rainy days. Very heavy falls on the 7th and 23d; on the 22d constant rain. These details are entered into, because this falling back of the weather to its old irregularity, had an immediate effect in reviving the Epidemick, both among Europeans and Natives; and led to serious apprehensions, lest it were again about to run a new and fatal course, as it did after the short lull during the Cold Weather of the preceding year.\*—Many cases; and some deaths, occurred during the first twenty days of the month; but the disease was more tractable than during its former visits; and again withdrew, as the month of May brought round steady Southerly winds, and settled weather.

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\* The same unsteady weather and sudden vicissitudes

Of the preceding Rains it may be remarked, that in every part of the Upper Provinces they were much heavier, and generally set in earlier, than for many years before.— In the Dooab, the districts in the vicinity of Delhi, Jeypore and the other Rajpootanah States, and in Nagpore and the tracts bordering on the Nerbudda, they were unusually violent; and continued long, with little intermission. They at length, gave way to an unusually severe, and healthy Cold Season; in which the Thermometer, even as low down as the northern extremity of Bengal, fell during several nights to the freezing point; and for many days in January did not rise higher than 37°: at eight in the morning: a degree of cold usually quite unknown to that part of the Country.

This sketch of the Weather being now brought to a conclusion, some apology may be necessary for its prolixity and minuteness of detail.— It might, indeed, have been wished, to make it less

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of temperature probably extended all over Bengal; as the Medical Returns, for this month, shew that the Epidemic was at this time; and during the preceding month, on foot, in Sylhet, Mymensing, Dacca, Backergunge, Cuttack, Balasore, Midnapore, Jungle Meauls, Hoogly, Nuddea, Bhawulpore, Patna, Chunar, and their respective neighbourhoods. At this period too, the disease appeared at Hoshungabad, the head quarters of the Nerbudda Field Force; and in Major Agnew's Camp near Ougein.

dry and tedious.—But it was only by entering largely into particulars, and by minutely following the successive variations of each period, and thus affording the reader an opportunity of comparing them with the fluctuations in the healthiness of those periods, that we could hope to trace a connection between the generation of the prevailing pestilence, and the preceding irregularities in the season. How far this has been successfully done, must be left to the reader's judgment, when he shall have perused the account of the rise of the Epidemick now about to be given.—This, at least, he will not doubt, that there was a remarkable coincidence between the extraordinary irregularities manifested throughout India in 1816 and 1817, and the rise of the Epidemick; and that its subsequent abatements and revivals, were in some measure dependent on corresponding vicissitudes in the state of the Weather.

*Register of the Weather in Calcutta, stating the Height of the Barometer and Thermometer at 10 o'Clock A. M.\**

INTRODUCTION.

LXXX

1816		1817								Wind, &c.	
Date	Barr.	Ther.	Winds, &c.	Barr.	Ther.	Winds, &c.	Barr.	Ther.	Winds, &c.	Barr.	Ther.
May .....	1 29	65	85 Strong Southerly & Cloudy.	29:65	85 Mod. S. Clear, O	29:66	90 Mod. S. cloudy dry N. W.				
	2 65	85 Ditto ditto ditto	71 55 Fr. sh.	71 55 70 87	Ditto ditto ditto	74 86 Strong; cloudy; gale from E.	74 86 76 86	S. E.			
	5 71	85 Ditto ditto ditto	74 82 Fresh;	74 82 77 85	Ditto ditto ditto	77 83 N. W.	77 85 77 85	Dry N. W.			
	4 64	85 Ditto ditto ditto	75 82	75 82 78 82	Ditto ditto ditto	78 82 Rain.	78 82 78 82	5.			
	5 62	86 Ditto ditto ditto	75 83	75 83 75 83	Ditto ditto ditto	75 83 Mod. S. E.	75 83 75 83	Strong,			
	6 64	86 S.	75 84	75 84 75 84	Mod. S. and Clear,	75 84 S. C.	75 84 75 84	Strong,			
	7 63	85 S.	75 85	75 85 75 85	Strong S.	75 85 Clear.	75 85 75 85	Strong,			
	8 63	87 S.	75 86	75 86 75 86		75 86 Fresh,	75 86 75 86	Strong,			
	9 67	86 S.	75 87	75 87 75 87		75 87 Light,	75 87 75 87	Strong,			
	10 64	85 S.	75 88	75 88 75 88		75 88 Light.	75 88 75 88	Strong,			
	11 52	87 S. O.	75 89	75 89 75 89		75 89 Mod.	75 89 75 89	Strong,			
	12 48	87 S. hazy,	75 90	75 90 75 90		75 90 Fresh,	75 90 75 90	Strong,			
	13 51	87 S. cloudy,	75 91	75 91 75 91		75 91 Strong,	75 91 75 91	Strong,			
	14 38	87 Mod. S.	75 92	75 92 75 92		75 92 Cloudy,	75 92 75 92	Strong,			
	15 57	88 S.	75 93	75 93 75 93		75 93 Fresh S. E. rain, gale from S.E.	75 93 75 93	Strong,			
	16 41	89 S.	75 94	75 94 75 94		75 94 Fresh S. E. rain, gale from S.E.	75 94 75 94	Strong,			
	17 47	89 S.	75 95	75 95 75 95		75 95 Fresh S. E. rain, gale from S.E.	75 95 75 95	Strong,			
	18 50	89 Strong S.	75 96	75 96 75 96		75 96 Fresh S. E. rain, gale from S.E.	75 96 75 96	Strong,			
	19 62	89 S. C.	75 97	75 97 75 97		75 97 Fresh S. E. rain, gale from S.E.	75 97 75 97	Strong,			
	20 61	89 S. I.	75 98	75 98 75 98		75 98 Fresh S. E. rain, gale from S.E.	75 98 75 98	Strong,			
	21 55	88 S. slight rain,	75 99	75 99 75 99		75 99 Fresh S. E. rain, gale from S.E.	75 99 75 99	Strong,			
	22 50	88 S. Cloudy,	75 100	75 100 75 100		75 100 Fresh S. E. rain, gale from S.E.	75 100 75 100	Strong,			
	23 47	88 Mod. S.	75 101	75 101 75 101		75 101 Fresh S. E. rain, gale from S.E.	75 101 75 101	Strong,			
	24 55	89 S.	75 102	75 102 75 102		75 102 Fresh S. E. rain, gale from S.E.	75 102 75 102	Strong,			
	25 55	88 Light S. severe storm & rain,	75 103	75 103 75 103		75 103 Fresh S. E. rain, gale from S.E.	75 103 75 103	Strong,			
	26 59	86 Var. Cloudy,	75 104	75 104 75 104		75 104 Fresh S. E. rain, gale from S.E.	75 104 75 104	Strong,			
	27 60	87 N. W. and rain,	75 105	75 105 75 105		75 105 Fresh S. E. rain, gale from S.E.	75 105 75 105	Strong,			
	28 54	86 Mod. S.	75 106	75 106 75 106		75 106 Fresh S. E. rain, gale from S.E.	75 106 75 106	Strong,			
	29 53	86 Mod. S.	75 107	75 107 75 107		75 107 Fresh S. E. rain, gale from S.E.	75 107 75 107	Strong,			
	30 50	88 Rain.	75 108	75 108 75 108		75 108 Fresh S. E. rain, gale from S.E.	75 108 75 108	Strong,			
	31 51	89 Rain.	75 109	75 109 75 109		75 109 Fresh S. E. rain, gale from S.E.	75 109 75 109	Strong,			
Average.	29:55	87									

29:55 87

Mon. C First quarter;

O Full; C Last quarter;

\* These Tables may be compared with the Meteorological Journals for 1784-5, published by M. Henry Toulon in the Appendix to the 3d Volume of the same work; both of which appear to have been left out of the 1st Vol.

From 1st May 1818, the observations are noted at Noon.

1818

1816		1817		1818					
Date	Barr.	Ther.	Wind, &c.	Barr.	Ther.	Wind, &c.	Barr.	Ther.	Wind, &c.
June, .....	1. 29:49	85	Light, var. cloudy,	29:57	84	Mod. S. E. cloudy,	29:16	90	Mod. S. rain,
	2. 49	87	N. Wr. □	47	84	Fresh,	71	89	Cloudy,
	3. 50	86		55	86	Mod. rain,	67	88	Rain,
	4. 48	88		55	86		69	88	Cloudy,
	5. 41	90	S.	54	87		63	88	Fresh, rain,
	6. 43	90	Fresh S. E.	44	87		67	86	S. E.
	7. 45	91		53	86	N. E. much rain,	66	86	Cloudy,
	8. 46	90	Strong S.	39	83	E.	75	90	Strong S.
	9. 59	91	Storm and rain from N. W.	47	82		80	91	Heavy rain,
	10. 40	89	Mod. S. cloudy	44	80		84	87	Cloudy,
	11. 58	89	Fresh,	40	82	Mod. S. rain,	79	90	
	12. 45	89	Strong,	38	83		74	90	Clear,
	13. 49	90		39	85	Cloudy,	72	90	Heavy rain and N. Wr.
	14. 53	89	Var. rain from W.	39	85	Var.	69	91	Fresh, cloudy,
	15. 55	87	Fresh S. cloudy,	36	84	Rain,	67	87	Rain N. Wr.
	16. 49	87	Mod. var.	32	84	Much rain,	64	88	Cloudy,
	17. 46	88	S. □	58	81		70	87	Rain,
	18. 62	88		35	79	Fresh S.	65	87	
	19. 51	87	Var. rain,	50	80	Rain,	60	86	Heavy rain,
	20. 45	87	Very cloudy,	60	85		59	84	
	21. 57	87	Fresh N. E. and rain,	61	84	Strong, clouds,	61	83	
	22. 34	85	E.	52	85		61	83	
	23. 59	84		50	85		64	82	
	24. 42	80	Light, Fresh S.	44	86	Rain,	66	84	Cloudy,
	25. 51	83	Fresh S.	37	85	Much rain,	63	84	Clear,
	26. 60	85	Strong, cloudy,	27	85	Fresh,	59	88	Cloudy,
	27. 56	85	Rain,	37	83	Rain,	64	87	Mud. rain,
	28. 50	84	Cloudy,	45	83	Much rain,	65	87	
	29. 45	84	Very strong & rain from N.W.	45	62	Rain,	59	86	
	30. 36	84		48	84		55	86	
Average. ...	29:45	85:96		30:1	85:63		29:66	87:06	

## **INTRODUCTION.**

1816		1817		1818		
Date	Barr.	Winds, &c.	Ther.	Winds, &c.	Winds, &c.	
July. ....						
1 29:34	84	Fresh, S. cloudy & rain, fog in night.	29:52	Fresh, S. cloudy,	29:56	Mod. S. cloudy,
2 41	85	Light, rain,	51	S. W.	50	Rain,
3 42	84	S.E. slight rain,	48	Heavy rain,	55	Cloudy,
4 43	85	Fresh E.	43	Mod. var. much rain,	54	Fresh, S. W. heavy rain,
5 35	84	N.E.	46	Cloudy,	52	Strong, W.
6 41	84	E.	55	Fresh, S.	44	Cloudy,
7 44	85	Mod. S. E.	53	Mod. var. much rain,	44	Mod. much rain,
8 37	85		47	Light, clear,	63	Mod. much rain,
9 34	85	Light, "cloudy,	41	Cloudy,	63	Mod. much rain,
10 25	85	Fresh, N. W. much rain,	46	Cloudy,	50	Mod. much rain,
11 16	82	Strong,	49	Mod. S. rain,	39	S. cloudy,
12 12	81	Mod. S. E. rain,	47	Much rain,	54	Mod. S. cloudy,
13 32	81		41	Rain,	81	Strong, rain,
14 40	82	Cloudy,	44		67	Fresh, rain,
15 48	82	Rain,	59	Fresh, S. E. cloudy,	73	Mod.
16 58	83	Light, var.	39	Rain,	75	Cloudy,
17 33	83	Mod. S.	85	Rain,	75	Cloudy,
18 35	82		28	E.	78	Fresh, clear,
19 42	82		24		85	Fresh, clear,
20 46	82		91	Strong, much rain,	81	Cloudy,
21 49	83	Light, rain,	40	Fresh, rain,	87	Mod.
22 50	84		36		7	Rain,
23 42	83	Rain,	85		67	
24 43	82	Much rain,	57	N. E. much rain,	86	
25 44	81		38		67	
26 37	80	Strong S. W.	31	S. E.	69	
27 42	82	S. light, rain,	30	S. W.	70	
28 45	83	Cloudy,	35	Mod. cloudy,	85	
29 43	84	Rain,	84	Rain.	66	
30 46	83	Mud, heavy rain,	35		66	
31 52	81	Fresh rain,	84		66	
Average. ...	29:39	82:9	39	V. rain,	70	
	39	83	83		65	
	80	80	84		60	
			80		80	
					84	

Date	Barr.	Ther.	1816		1817		1818	
			Winds, &c.	Barr.	Ther.	Winds, &c.	Barr.	Ther.
August. ....	1 29:51	83	Light, S. cloudy,	29:51	84	Fresh, N. cloudy,	29 81	86
	2 44	84	Fresh,	23	84	S. rain,	71	86
	3 47	85	Light, S. E. slight rain,	44	85	Mod. cloudy,	66	82
	4 47	83	Cloudy,	53	85	S. E. rain,	65	86
	5 48	83	Fresh rain,	52	85	Cloudy,	75	84
	6 43	84	E.	50	84	Slight rain,	74	86
	7 56	84		56	84	Coudy,	67	87
	8 35	84	O	58	81	Much rain,	61	86
	9 35	84		64	83	Fresh,		
	10 40	84		60	81	Strong, S. W.		
	11 46	85		56	80			
	12 48	84	Light,					
	13 50	85	N. E.					
	14 50	84	E.					
	15 46	82	Fresh, S. E. heavy rain.	55	84	Cloudy,		
	16 46	82	S.	53	85	N. W. rain,		
	17 50	84		58	85	Mod. W.		
	18 51	84	Mod. S. E.	61	86	Light, clear.		
	19 52	84	Rain.	58	87	Rain,		
	20 49	84	Light, slight rain,	63	85			
	21 47	65	Cloudy,	65	87	Mod. S. W. clear,		
	22 45	65		61	87	Fresh, S.		
	23 44	87		57	87	Mod. S.	50	86
	24 39	86	Fresh, S. W. rain,	55	87	S. E. rain,	61	86
	25 37	84	S. E.	50	86	E.	64	84
	26 41	84	Light, variable,	48	86		66	86
	27 45	85	Cloudy,	51	85		67	85
	28 52	85	W.	53	85		63	85
	29 56	86		57	86		58	86
	30 54	86	S. W.	21	85		66	85
	31 48	87	Mod.	56	85	S. E.	75	86
				41	84	Much rain,	75	85
Average. ...	29:45	84:52					29:50	84:57

## INTRODUCTION.

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		1816				1817				1818			
Date	Barr.	Ther.	Winds, &c.	Barr.	Ther.	Winds, &c.	Barr.	Ther.	Winds, &c.	Barr.	Ther.	Winds, &c.	Barr.
September.													
1	29:48	87	Light, S. W. clear,	29:43	84	Mod. S. E. cloudy,	29:73	85	Muu. S. E. rain,	29:73	85	Muu. S. E. rain,	29:73
2	47	88	Fresh, W. Hazy,	41	85	Rain,	76	86	Fresh, much rain,	72	82	Fresh, much rain,	76
3	55	89	Mod. cloudy,	27	87	Cloudy,	66	84	S.				
4	59	88	S. W.	55	86	Strong rain,	66	82	S.				
5	59	88	Heavy rain from, E.	37	85		66	82	S. E.				
6	67	87	S. rain,	40	85	Fresh,	76	83	Cloudy,				
7	33	84	Fresh,	47	84		79	83	Rain,				
8	57	84	E. much rain,	52	84	Much rain,	71	85					
9	60	84	Mod. rain,	6	84		67	83	Strong. S W. much rain,	62	82		
10	65	84	S. E.	67	85		62	82					
11	61	84	Var. much rain,	63	85	Rain,	72	82					
12	56	85	E. rain,	61	85	Much rain,	86	84	fresh, cloudy,				
13	53	85		62	80		86	84	S. rain,				
14	50	85	Fresh, much rain,	61	83	Light, cloudy,	80	85	S. E. much rain,				
15	47	84	Rain,	59	84		78	83					
16	56	84	Heavy rain,	56	85	N. clear,	86	84					
17	67	84	Cloud,	57	86	S. rain,	88	85	Clear,				
18	68	84	Heavy rain,	67	86	Cloudy,	86	84	Rain,				
19	67	84	N. E.	76	87	Rain,	89	85	Mod. cloudy;				
20	72	83	Clear,	76	86	Mod. heavy rain,	85	85	E.				
21	74	84		71	85	S. E. cloudy,	87	85	Cloudy, fog.				
22	74	84		79	85	S. W. clear,	84	85					
23	68	85	S. E. cloudy,	83	85	Fresh,	83	84					
24	63	82	Mod. E. constant rain,	76	84		77	84	Heavy rain,				
25	61	80	Much rain,	75	86	Strong. S. E. very heavy rain	78	84	E. rain,				
26	63	80	Fr-sh. S. E. rain,	74	81	Fresh. S. clear,	79	84					
27	66	82		80	80	Var. cloudy,	73	85					
28	67	81	Heavy rain,	78	84	Light, clear, fog.	78	85	Cloudy,				
29	67	81	Strong. S. W.	79	85		80	86	S. rain,				
30	62	81		75	86	Rain,	84	84	Much rain.				

Average. - 29:60 84:16

29:62 84:50

84:06

1816		1817		1818	
Date	Bar.	Therm.	Wind., &c.	Barr.	Therm.
October: ..	1 25:66	81 Light, E. cloudy,	29:78	85 Mod var. rain,	29:76 Fresh, S. W. much rain,
	2 70	82 S. W. rain, fog,	81	85	76 69 S. rain,
5	70	82 W. clear,	79	Fresh, S.	78 82 S. E. cloudy,
4	76	85 Fresh,	76	S. E. much rain,	Strong, S. clear,
5	76	85 Mod.	73	82 Mod. clear,	Fresh, cloudy,
6	77	85 N. W.	80	84	80 84 Fresh, cloudy,
7	77	85 W. cloudy,	80	86	83 85 Mod. S. W. clear,
8	77	85 N. W. clear,	75	86	78 86 Mod. S. W. clear,
9	74	86 W.	75	86	81 86
10	74	86	77	85	
11	76	86 Light, N. W.	81	85	
12	8	85	78	86	
13	8	85 Prog.	79	86	
14	95	84	82	86	
15	95	85 W. cloudy,	85	86	
16	88	84 S. W.	85	86	
17	84	83	80	84	
18	83	83 Clear,	71	H. J. N. E. much rain,	
19	84	85 W. cloudy,	69	74 Fresh, S. cloudy,	Mod. N. W. c'ear,
20	89	85 Variable,	67	80 Mod. var.	85 N.
21	78	85 Mod. N. E.	75	80 W.	
22	82	89 Fresh, N.	75	81 Var. 'ear,	
23	82	81	75	81 N. W.	
24	83	81	75	82	*
25	87	81 Clear,	74	82	95 85
26	90	79 Mod. N. W.	75	85 S. W. cloudy,	N. E. cloudy,
27	96	79 Fresh,	80	85	30:05 85
28	91	78	78	86	86 85
29	89	78	81	85 Rain,	29:37 86
30	90	78 Mod. cloudy,	74	86 Cloudy,	99 99
31	92	79	-	-	84 Fresh,
					50:00 82

1816 - 29.42 82.58

99.43:49

## INTRODUCTION.

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		1816		1817		1818	
Date	Barr. [Iber.]	Winds, &c.	Barr.	Ther.	Winds, &c.	Barr.	Ther.
November.							
1	29:50	78 Light, N. W. clear,	29:79	84 Mod. S. cloudy,	29:97	85 Mod. N. E. clear,	
2	94	80 W. cloudy,	77	81 N. W. clear,	94	83 N.	
3	98	79 Mod. S. W. clear,	81	82 N. W. cloudy,	96	82 Var. fog.	
4	95	78	77	83 Rain,	34	82 Var. fog.	
5	89	79 N. W.	74	80 Fresh, N. clear,	90	86 N. clear,	
6	85	77	85	78	90	82	
7	83	78 N.	9:	78	98	81	
8	87	76 Fresh,	30:01	77	50:04	80	
9	87	75	29:96	78 N. E.	05	80	
10	92	75 Cloudy,	8:	78	04	80	
11	38	74 Clear,	8:	79 Light, var. cloudy,	08	82	
12	81	74 Mod. variable,	8:	79 Mod. N.	12	82 N. E.	
13	77	74 N. W. fog, night	85	77 Clear,	06	81	
14	87	75 Ditto,	80	75 Fresh,	04	81 N.	
15	99	74	8	75	04	80 Fresh, clear,	
16	91	74	8:	77	0:	79	
17	75	S. W. fog,	8:	76 Mod. W.	0:	79	
18	86	78 S. thick fog,	8:	76 S. W.	05	81	
19	90	78 Fog,	80	77 S. E. cloudy,	10	80 N. clear,	
20	92	77	77	77	00	78	
21	88	77	7:	77	00	77 Fresh,	
22	95	77	73	76	0:	77	
23	98	76 S. W. fog,	74	77 Fresh var. N. W. much rain,	05	76	
24	97	75 N. W.	81	75 N. E. clear,	00	77	
25	90	74	88	71 N. W.	29:98	76	
26	92	74	86	70 N. E. cloudy,	30:99	75	
27	90	75 Fresh, N. E.	8:	69	0:	75	
28	67	69	8:	70	0:	75	
29	88	68 N. W.	80	74 Mod. rain and thick fog.	05	75	
30	90	69 W. fog.	80	74	00	75	
Average. . . .	29:89	75:53	39:82	76:75	30:1	79:5	

1816		1817		1818	
Date	Barr.	Winds, &c.	Barr.	Winds, &c.	Barr.
December 1	29: 90	Mod. W. clear, fog.	29: 87	Mod. S. E. rain,	30: 03
2	88	71	88	N. E. cloudy,	76
3	90	69	87	N. W. clear,	76
4	97	71	88	Fresh,	77
5	97	71	90	Mod. var.	76
6	94	71	88	N.	77
7	93	70	86	71	Cloudy,
8	20: 03	70	89	73	Hazy,
9	29: 96	69	90	70	Cloudy,
10	98	70	90	70	Cloudy,
11	93	69	91	70	Cloudy,
12	91	68	91	70	S. cloudy,
13	92	69	90	70	Mod. cloudy,
14	90	67	90	70	Mod. N. E. cloudy,
15	86	66	93	70	Mod. N. E. cloudy,
16	+ 80	66	95	69	Fresh, N. W. clear,
17	86	67	95	70	Fresh, N. W. clear,
18	91	67	95	67	Fresh, N.
19	91	67	95	65	Fresh, N.
20	90	68	95	65	Fresh, N.
21	91	68	96	65	Fresh, N.
22	90	68	95	67	Fresh, N.
23	95	68	90	68	Fresh, N.
24	95	69	68	69	Fog.
25	96	69	86	70	Fog.
26	94	69	93	69	N. W.
27	87	67	87	71	N. W.
28	90	69	90	73	W. fog.
29	98	68	90	74	W. fog.
30	98	67	96	74	N. W.
31	98	66	81	71	Fog.

## **INTRODUCTION.**

1817		1818		1819			
Date	Barr.	Winds, &c.	Barr.	Winds, &c.	Barr.		
January ...							
1 29: 98	68	Mod. N. clear, fog.	20: 96	70 Mod. N. W. clear,	10: 06	71 Mod. N. clear, fog.	
2 95	69	Cloudy,	98	63 Fresh. N.	02	73	
3 97	67	Clear.	30: 01	67	29	72	
4 95	68	O	00	67	96	75 Var.	
5 87	69	Fresh, S. W. cloudy,	29: 95	65 Light, N. W. *	97	73 Cloudy, thick fog.	
6 92	67	N. W. clear,	30: 00	69	97	73 Fog.	
7 97	68	N.	29: 95	69	30: 00	70 Fresh, N. clear,	
8 95	68	O	94	68	29: 98	67.	
9 95	68	Fog.	90	70	97		
10 98	68	Cloudy,	89	70			
11 50: 03	67	Clear,	88	70	94	72	
12 29: 97	68	O	88	70	86	72	
13 50: 03	67		93	73			
14 02	65		97	71	88	72	
15 29: 99	65		92	70	94	Fresh,	
16 95	65		87	70	95	N.	
17 99	66	Cloudy,	80	69			
18 92	68	Clear,	84	67	96	65	
19 30: 01	66	O	90	65	98	65	
20 03	64		85	66	93	67	
21 29: 95	67	Mod. cloudy,	80	69	96	69.	
22 29: 99	66	N. W. clear,	84	69			
23 92	68	O	85	68	90	65	
24 88	70	Fresh, S. W. fog.	90	67	95	65	
25 91	69	N. cloudy,	91	68	97	Fresh,	
26 96	69	Clear,	94	67	95		
27 98	68	Mod.	94	68	68	Mod.	
28 95	69	S. W. cloudy,	93	70	94		
29 95	72	Light, var. thick fog.	92	72	50: 01	67	
30 97	72	Fresh, S.	87	72	02	69	
31 96	72	Mod. thick fog.	76	75	02	70	
Average &c. ...		29: 96	67: 85	29: 90	68: 24		

		1817				1818				1819					
Date	Barr.	Winds.	&c.	Barr.	Ther	Winds.	&c.	Barr.	Ther	Winds.	&c.	Barr.	Ther	Winds.	&c.
Feb. 1, 1817	1 29:95	75	Mod. S. fog, heavy rain at Nig.	29:93	68	Strong, N. W. clear,	O	50:05	71	Mod. N. clear,		50:05	71	Fresh,	
	2 85	73	Cloudy, heavy rain,	9c	66			10	71			10	71		
	5 91	75	Fresh, E.	9f	66			09	74	Mod. var.		09	74	Mod. var.	
	4 88	71	Much rain,	96	66			01	74	Fog.		01	75	Fog.	
	5 30:02	68	N. Cloudy,	90	68	Mod. var. fog.		01	75			01	75	N.	
	6 01	67	Clear,	9c	71	S. W. cloudy,									
	7 07	68		8h	75	W.									
	8 06	69	Mod. var. cloudy, fog.	94	70			01	75	Fresh,		01	75	Fresh,	
	9 01	69		93	70	Fresh, N. clear,		04	73			04	73		
	10 29:92	71		93	69			06	71	Var.		06	71	Var.	
	11 94	71	Rain,	87	71			06	71			06	71		
	12 87	75	Cloudy,	84	71	Mod. var.		07	72	Mod.		07	72	Mod.	
	13 96	75	S.	87	70	S. thick fog.		07	74	Fog.		07	74	Fog.	
	14 91	76		83	69	Cloudy,		29:93	76	Cloudy,		29:93	76	Cloudy, fog.	
	15 89	74	Fresh, E.	90	71	Clear,		89	77	Clear, thick, fog.		89	77	Clear, thick, fog.	
	16 94	79	N. E.	92	73	Var. fog.		86	82	Fresh,		86	82	Fresh,	
	17 89	73		80	72	Cloudy,		90	80			90	80		
	18 86	75	S. W. heavy rain and wind,	68	71	Cloudy, fog.		89	78	Cloudy,		89	78	Cloudy,	
	19 84	71	N. cloudy,	67	73	S. clear, fog.		90	79	N.		90	79	N.	
	20 80	71	Mod. var. N. W. much rain,	77	72	"		95	76	Clear,		95	76	Clear,	
	21 80	71	Fresh rain,	76	78			50:07	75			50:07	75		
	22 70	70	Much rain,	75	78	Fresh, cloudy, fog.	O	05	78			05	78		
	23 86	67	N. cloudy,	7t	80	Strong,									
	24 85	67	Mod. clear,	74	90	Cloudy, N. W.		00	81	Mod. S.		00	81	Mod. S.	
	25 81	70	Cloudy,	77	80	Cloudy, N. W.		29:90	82	Fresh, cloudy,		29:90	82	Fresh, cloudy,	
	26 84	72	Var.	80	79	Heavy rain,		98	80			98	80		
	27 86	70		84	79			30:07	78	N. clear,		30:07	78	N. clear,	
	28 88	72		85	77	Fresh var. rain,	C	00	77			00	77		
Av. temp.		29:89 71: 2				29:84 72:15									

INTRODUCTION.

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Date	Bar.	Ther.	1817			1818 *			1819		
			Winds,	&c.	Barr.	Ther.	Winds,	&c.	Barr.	Ther.	Winds,
March.....	1	29 8:6	75	Fresh, N. E. clear,	29:84	75	Fresh var. cloudy,	N. E.	23:90	80	Fresh, S. clear,
	3	80	75	Var. constant heavy rain,	88	75	85	N. W.	91	89	Fog.
	5	80	67	Much rain,	75	75	75	Rain,	96	83	Mod.
	4	85	68	Mod. var. clear,	85	75	75	Rain,	4:3	82	Mod.
	5	81	69	S. W.	79	74	74	N. W.	89	84	
	6	87	72	Fresh,	81	75	75	Clear,	90	83	Light fog.
	7	85	73	S.	86	74	74	W.	90	84	
	8	86	76	Cloudy,	86	74	74	S. W.	89	83	Mod. fog.
	9	88	75	N. W.	80	78	78	Mod. hazy,	87	85	
	10	78	77	Clear, N. W.	77	75	75		68	82	Var.
	11	80	76	Mod. var.	73	75	75		90	84	
	12	84	77	S. cloudy; N. W.	69	78	78	Fresh, S. clear,	90	84	
	13	87	71	W.	74	79	79		94	84	S. cloudy,
	14	90	76	S. W.	75	82	82		93	83	
	15	93	76	Fresh, N. dry, N. W.	78	81	Cloudy, thick fog,		95	83	Strong,
	16	91	75	Mod. N. W.	80	82	Clear,		87	84	
	17	88	76	Fresh, S. clear,	81	81	81	Mod. fog.	89	84	
	18	80	78	Strong rain, N. W.	74	81	81	Rain, S. E.	92	85	
	19	74	76	Var. much rain,	66	81	Cloudy, storm of rain, N. E.		96	85	N. W.
	20	75	74	Fresh, S. E. clear,	74	82	82	Strong ditto, N. W.	88	82	Clear,
	21	60	77	Var. severe storm of rain,	80	80	80	N. W. much rain,	81	84	
	22	84	75	S. clear,	8:7	78	78	Var. ditto,	83	83	Cloudy,
	23	78	74	Mod. N. W.	66	87	87	ditto,	87	81	
	24	78	76	Fresh, S.	8:6	79	79	ditto,	90	85	
	25	76	78	Cloudy,	8:5	80	80	Cloudy,	86	86	Clear,
	26	70	80	Clear, N. W.	8:1	81	81	Mod. var. rain,	79	86	Strong, cloudy,
	27	70	81	Rain,	8:4	79	79	N. E.	71	86	N. W.
	28	76	78	Mod. cloudy,	71	81	81	Var. Gale from S. W. & rain,	77	84	Cleas.
	29	75	78	Fresh, clear,	74	80	80	S. rain,	81	85	
	30	71	80	Cloudy,	75	80	80		81	85	
	31	80	82	Severe N. W.	81	82	82	Cloudy,	83	86	

Average... 29:81 75:14

29:79 78:10

1817				1818				1819					
Date	Barr.	Ther.	Winds, &c.	Barr.	Ther.	Wind, &c.	Barr.	Ther.	Wind, &c.	Barr.	Ther.	Winds, &c.	
April.....	1	29	88	80	Light, S. cloudy,		29	88	Mod. var. cloudy,		29	80	Fresh, S. clear,
	2	73	81	W. clear,			89	85	N. E.		86	91	
	3	78	82	N. W. cloudy, N. W.	O		87	80			85	87	Strong,
	4	84	61	W. clear,			83	80			83	87	Cloudy,
	5	54	55	S. hazy,			82	82	Rain,		72	87	
	6	77	84	Mod.			82	81	Fresh, cloudy,		85	87	
	7	70	85	Fresh, clear,			80	80	Mod. var. clear,		93	84	Var. much rain,
	8	72	64	Fresh, clear,			83	83	Cloudy,		95	80	Fresh, S. rain,
	9	68	74				81	81	S.		90	81	Clear,
	10	75	84	Strong clouds,			76	84	Fresh,		84	84	Cloudy,
	11	75	52	Clear, foggy;			74	83	Cloud,		78	85	Rain,
	12	71	84	Clouds, dry, N. W.			75	81	Var. cloudy, Gale, S. W.		88	83	Mod. cloudy,
	13	68	82	Clear,			73	79	Rain, ditto ditto,		87	85	Fresh,
	14	68	89				80	80	Cloud,		72	85	Squalls,
	15	67	85	Cloudy, N. W.			67	81	Gale, S. E.		71	87	
	16	67	83				70	81	Gale, S. E.		72	87	
	17	68	84	Fresh, clear,			67	85	Strong, S.		78	87	Rain, N. W.
	18	71	84	Mod. cloudy, sev. Thunder			75	84			90	85	Var.
	19	77	84	Var.			74	85	Storm,				
	20	73	81	Sev. N. W.			63	86			80	86	Mod. cloudy,
	21	70	82	Fresh, S. clear,			53	86			79	86	Fresh, E. rain,
	22	64	83	Strong,			65	86			77	82	Constant rain,
	23	67	82	Hard, S. E. cloudy,			64	86	Clear,		69	78	Vari. much rain,
	24	60	84	Strong, S.			66	87			70	79	S. cloudy,
	25	56	84				70	87			74	79	
	26	56	85	Hard,			65	86	Cloudy,		75	85	
	27	55	85	Mod. clear,			67	87			75	86	Mod. S. E.
	28	58	85	Fresh, cloudy,			69	86			80	86	Fresh,
	29	62	85				71	88			83	87	S.
	30	64	85	Clear.			71	87			76	88	
Average....		29.69	85.7								20.73	83.9	
												29.80	84.23

**INTRODUCTION.**

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*State of the Thermometer in the Hospital of His Majesty's  
24th Light Dragoons, during the Month of Septem-  
ber, 1817.*

*Calonpore, 1st October, 1817.*

<i>Days.</i>	<i>Sunrise.</i>	<i>Noon.</i>	<i>Sunset.</i>	<i>REMARKS.</i>
1	84	90	90	Wind Easterly, sultry,
2	85	92	90	Ditto ditto,
3	84	92	90	Wind Westerly, ditto,
4	84	94	92	Ditto ditto,
5	84	92	90	Wind Easterly, ditto,
6	86	94	92	Ditto ditto,
7	85	93	92	Ditto ditto,
8	85	93	92	Ditto ditto,
9	85	93	92	Ditto ditto,
10	84	92	92	Ditto ditto,
11	84	90	85	Wind Westerly, much rain in the
12	82	86	88	Wd. Ey. Cool, some rain, [afternoon,
13	82	86	88	Ditto cloudy,
14	82	88	89	Ditto ditto,
15	82	90	89	Ditto clear,
16	84	92	92	Ditto sultry,
17	86	94	93	Ditto ditto,
18	86	94	93	Ditto ditto,
19	86	96	93	Ditto ditto,
20	84	94	92	Ditto ditto,
21	85	95	92	Ditto ditto,
22	85	93	91	Ditto ditto,
23	84	91	90	Ditto ditto,
24	82	90	86	Wd. variable, afternoon rain,
25	82	90	88	Wd. Wy. afternoon, strong wind,
26	83	91	90	Ditto sultry,
27	83	90	89	Wd. Ey. ditto,
28	82	90	89	Ditto ditto,
29	82	91	90	Ditto ditto,
30	83	93	83	[and rain, Wd. Wy. ditto, afternoon Ey. Wd.

for the first time within the memory of man, the  
**A**

## DOAB.

*State of the Thermometer in the Hospital of His Majesty's  
24th Light Dragoons, during the Month of October,  
1817.*

*Camp, Jaulian, 1st November, 1817.*

	Date.	Sunrise.	Mean.	Sunset.	REMARKS.
On the Line of March in Tents.	1	82	88	86	Wind Easterly, clear,
In Cautionnaries.	2	82	86	85	Ditto cloudy,
	3	80	86	83	Ditto do. afternoon much rain,
	4	78	88	86	Ditto ditto few drops,
	5	79	88	86	Ditto ditto,
	6	80	89	88	Ditto forenoon little rain,
	7	80	88	86	Do. afternoon cloudy, littlerain,
	8	79	90	88	Ditto clear and sultry,
	9	76	89	88	Wind Westerly, ditto ditto,
	10	77	90	88	Ditto ditto,
	11	76	92	90	Ditto ditto,
	12	76	93	90	Ditto ditto,
	13	78	94	91	Ditto ditto,
	14	78	91	90	Ditto ditto,
	15	79	93	91	Ditto ditto,
	16	79	89	88	Ditto ditto,
	17	78	90	88	Ditto ditto,
	18	78	91	89	Ditto ditto,
	19	77	88	86	Wind Easterly, strong,
	20	76	89	86	Ditto sultry,
	21	75	92	90	Wind Westerly and hot,
	22	75	96	90	Ditto ditto,
	23	75	98	96	Ditto ditto,
	24	76	95	90	Ditto ditto,
	25	75	96	88	Ditto ditto,
	26	72	98	94	Ditto ditto,
	27	68	98	88	Ditto ditto,
	28	66	99	89	Ditto ditto,
	29	64	99	89	Ditto ditto,
	30	64	96	86	Ditto ditto,
	31	62	96	84	Ditto ditto,

## INTRODUCTION.

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*Bundelkund Centre Division of the Army.  
Meteorological Table for November, 1817.*

Date.	Height of Thermometer.			Winds.
	At C A. M.	At noon.	At 6 P. M.	
1	61	94	76	Westerly by N.
2	61	92	78	Ditto,
3	56	89	90	Ditto,
4	54	88	68	Ditto,
5	56	90	68	Ditto,
6	50	90	68	Ditto,
7	45	90	63	Easterly, W. by N.
8	47	88	68	Ditto,
9	50	87	68	Ditto,
10	50	86	68	Ditto,
11	50	84	68	Ditto,
12	51	84	68	Easterly,
13	57	86	68	Ditto,
14	56	88	68	Ditto,
15	58	90	68	Ditto,
16	58	90	68	South East,
17	56	88	68	W. by N.
18	52	84	68	Ditto,
19	52	84	66	Ditto,
20	50	84	68	Ditto,
21	52	90	64	Ditto,
22	52	84	66	Ditto,
23	52	80	64	Ditto,
24	52	82	68	Ditto,
25	44	82	66	Ditto,
26	52	82	62	Ditto,
27	56	82	62	Easterly,
28	42	78	60	Ditto,
29	42	76	60	Ditto,
30	44	76	60	Westerly.

*Bundelkund Centre Division of the Army  
Meteorological Table for December, 1817.*

Date.	Height of Thermometer.			Winds.	REMARKS.
	At 6 A. M.	At noon	At 6 P. M.		
1 46	78	60	N. W.		
2 46	78	62	Ditto,		
3 46	78	64	Ditto,		
4 46	78	62	Ditto,		
5 46	78	62	Westerly,		
6 46	72	62	Ditto,		
7 46	86	62	Ditto,		
8 46	86	60	Ditto,	Cloudy,	
9 46	76	60	Ditto,	Clear.	
10 46	80	60	Ditto,		
11 44	80	60	Ditto,		
12 44	78	60	S. S. E.		
13 46	82	62	.....	Cloudy,	
14 50	86	64	N. W.	Ditto wind, high,	
15 54	76	64	.....	Ditto,	
16 48	72	58	N.	Clear, wind high,	
17 41	70	54	N. W.	Ditto,	
18 40	72	54	.....	Calm and serene,	
19 38	73	56	.....	Cloudy,	
20 40	72	56	.....	Ditto,	
21 40	74	58	Easterly,	Ditto,	
22 44	72	58	.....	Slight shower in the afternoon,	
23 54	70	58	.....	Several showers during the night,	
24 41	72	58	.....	Heavy dew and thick fog in the morning,	
25 50	72	60	N. E.	Wind high, Thunder storm, [and rain,	
26 58	70	68	.....	Showers and wind various, evening Thunder	
27 60	74	68	N. W.	Thick fog & mild rain, evening heavy showe	
28 62	64	61	.....	Ditto ditto perfectly cloudy to near sun set,	
29 47	68	54	Westerly,	Cloudy and wind various,	
30 44	70	62	Easterly,	Heavy dew this morning and some clouds,	
31 46	72	58	North,	Clear.	

## **SECTION I.**

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### **RISE AND PROGRESS**

**OF THE**

### ***EPIDEMICK.***

THE disease termed by Nosologists Cholera Morbus, being in the higher latitudes chiefly confined to the latter part of Summer, and the beginning of Autumn; and manifestly originating in the great heats peculiar to that period of the year; it might have been expected to occur commonly in countries placed within the tropics.—It has accordingly been found, that a disorder, possessing the principal characteristics of that disease, has prevailed more or less endemically, during the Hot and Rainy Seasons of every successive year, in the Lower Provinces of Hindostan.

Previously, however, to the year 1817, when for the first time within the memory of man, the

disease assumed the epidemical form ; the sphere of its influence was very limited, and its destructive effects inconsiderable. Its attacks were chiefly limited to the lower classes of the inhabitants ; whose constitutions had been debilitated by poor, ungenerous diet, and by hard labour in the sun ; and who were badly clothed, and frequently exposed in low and foul situations to the cold and damp air of the night.—It rarely appeared in the dry and equable months of the Cold and Hot Weather ; and although cases were now and then met with during every part of the Rains, it always shewed itself in greatest vigour towards the autumnal solstice ; when the declination of the sun was still inconsiderable ; when the air was surcharged with moisture ; and when the alternations of atmospherical temperature were sudden and frequent. As the Cold Season came round, and brought with it, a clear atmosphere, and cool, dry and steady weather ; the disease became of less frequent occurrence ; and at length altogether withdrew.—The better descriptions of Natives, those who were well fed and sufficiently clad, who ventured little into the sun, and inhabited high, dry, and freely ventilated dwellings, were but little subject to its influence ; and so rarely did it reach the European portion of the community, that of two gentlemen in immediate charge, one for ten and the other for five years, of the General Hospital for Europeans.

at the Presidency, neither had seen a single case of the disorder, until it occurred epidemically throughout these Provinces.

The disease, which has been thus stated to be endemical in Bengal ; and to prevail more or less during certain parts of each year ; shewed itself sooner, and was perhaps more common in the first six months of 1817, than in former years.—

1817.

The Rains, it has been seen, set in that season at least a month earlier than usual ; and from the reports of the medical officers on the spot, Cholera would seem to have occurred in an unusual degree in some parts of Nuddeea and other districts in May and June. But as its attacks were yet restricted to particular places, and not very commonly fatal ; it does not appear to have excited much attention, until the middle of August, when the rapidity of its progress, and its general extension, began to create universal alarm.

Nuddeea

On the 28th of that month it was reported to Government, that the disease had suddenly appeared epidemically in Jessore, a populous town situated in the centre of the Delta of the Ganges ; that it was attacking all classes indiscriminately ; and was cutting off from twenty to thirty persons daily ; and that the inhabitants, astonished and terrified at the unaccountable and very des-

Jessore

tructive nature of its attacks, were flying in crowds from the place, as the only means of escaping impending death.—So little was the nature of the new pestilence yet understood; and such was the extreme consternation produced by it, that the Civil Courts of the District were shut; and a stop put for a time to business of every description. Although the general emigration which took place from the city, would seem to have had a decidedly beneficial effect on the state of its health, by diminishing that density of population, which has been since invariably found to be a powerful auxiliary to the Epidemick; yet such was the energy of the disease in this its first onset, and so fatally destructive was it of human life, that in this district alone, it is reported to have within the space of a few weeks, cut off more than six thousand of the inhabitants.

It is necessary to be thus particular regarding the breaking out of the disorder at Jessore; because from the alarming nature of the circumstances, which attended its appearance in that quarter; connected with its rapid and general spread as an Epidemick over almost every portion of the Lower Provinces, accompanying or immediately following that appearance; an idea then arose, and has since obtained very general belief, that Jessore was the place, in which the disease primarily originated, and whence, as from a fo-

cus, its pestilential virus, of whatever nature, emanated, to the surrounding districts. What served to give validity to this conjecture, was an opinion then entertained, and since industriously propagated, that the *fomes*, or specific poison producing the disease, had its rise, not in any vitiated state of the atmosphere, or other cause of general operation, but in circumstances of a purely local nature: such as the use of rancid fish and blighted grain.

It is nevertheless certain, that nothing could be more erroneous than this notion of the local origin of the Epidemick. For, not to speak of its frequent occurrence, so early as May in some parts of Nuddea, and other districts already adverted to, it is quite clear from the statements of the medical staff, written separately and without interchange of knowledge or communication, that, more than a month previously to Jessore's becoming affected, the disease had begun to prevail epidemically in the distant Provinces of Behar and Dacca; and that before the expiration of the first week in August, it had firmly established itself in many other parts of Bengal. Thus it is distinctly stated to have broken out in the City of Patna on the 11th of July; to have spread to the contiguous station of Dinapore, and the adjacent villages early in August; and to have remained without intermission in that neighbour-

Behar, Dacca.  
Cities of Patna, Dacca, Di-  
napore.

bourhood, until the end of January following.\*

**Sunergong.** In like manner, after having in July appeared at Sunergong, a Town on the banks of a branch of

the great river Megna, it thence proceeded, visiting the *ghauts* or publick ferries and grain markets in its way, to Nuraingunge and Dacca, where it arrived in the beginning of August. During the whole of July and August eight out of eighteen Police Departments into which zila Kish-

**Kishnagurh.** naghur or Nuddeca, on the east side of the Hoogly, is divided, were also fully subject to its influence ; and it had about the middle of the latter month even found its way to the remote Province of

**Sylhet,** Sylhet, which is separated from the eastern parts of Bengal Proper by the great Rivers Ganges and Burumpooter. On the 23d of August we find

it raging at Chittagong, far round the Eastern corner of the Bay of Bengal ; at the same moment in Rajshahy, a centrical district lying East of the Ganges ; and not a week afterwards, in the

**Bhaugulpore.** high and distant tracts of Bhaugulpore and Monghyr. The exact date of its appearance in

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\* It appears from accounts received since this sketch was drawn up, that the disease had ravaged Nuseerabad, a town in Momensing in June ; and had even largely affected the South Eastern Division of that district, in the early part of the month or last days of May : following the course of the Burumpooter ; and irregularly attacking the villages on its banks.

Calcutta has not been ascertained.—But there Calcutta. is little doubt, that it visited some spots of the town and suburbs as early as the beginning of August; that it daily gained ground, and before the end of the month had widely spread its ravages, in a manner threatening to sweep off a large portion of the Native population; and that in the early part of September, even the European portion of the community was no longer secure from the concentrated activity of the poison.

These facts are more than sufficient to shew the fallacy of every theory, which attempts to derive the disease from any local source; or to trace it to any one particular spot, as the centre from which it was emitted to the surrounding countries.—They prove, without the possibility of dispute, that it broke out at very remote places at one and the same time, or at the distance of such short intervals, as to establish the impossibility of the pestilential virus being, in this stage of its progress, propagated by contagion, or any of the other known modes of successive production; and that its general diffusion was therefore referable to some cause of more universal operation.\*

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\* A few dates may be marked of the principal places attacked in the early part of the progress of the Epidemic, according to the order of their succession.—May

Soon after the middle of September, the disease, now strictly epidemical, extended itself in every direction; within the short space of a few weeks stretching from the most easterly parts of Poorneea, Dinagepore, and Sylhet, to the extreme borders of Balasore and Cuttack; and reaching from the mouths of the Ganges nearly as high as its junction with the Jumna.

Poorneea,  
Dinagepore,  
Balasore and  
Cuttack. Within the area of several thousand miles, thus in so short a period brought under its influence, few towns or villages of any considerable size wholly escaped its attacks; almost every spot being, notwithstanding the great irregularity of its course, and waywardness of its approach, sooner or later, and in a greater or less degree, subjected to its dreadful visitations.—The cities

and June. One *Thanna* or police Division of Kishnagur; and Mymensing generally. July. Eight Divisions of the former district; Sunergong in the Dacca District; and on the 11th Patna. August. In the first week Calcutta, Dacca and Dinapore; about the middle, Nattore; on the 17th, Sylhet; on the 19th, Jessore; and towards the end of the month, Bhaugulpore and Monghyr. September 15th. Balasore, Burisaul, Burdwan; 17th, Buxar; 18th, Chupra and Ghazeepore; in the latter part Moozufferpore. October, Baulea; 15th, Berhampore, and Rungpore. It is only necessary to cast one's eye over the map to perceive immediately how irreconcileable these dates, and the intermediate distances are with the suspicion of local origin.

of Dacca, and Patna, the towns of Balasore, Burrisaul, Burdwan, Rungpore, Malda, Bhau-gulpore, Chupra, and Moozifferpore, with the Military stations of Monghyr, Buxar, and Ghazeepore, all suffered severely : and throughout the whole extent of the Delta of the Ganges, and more especially in the tracts bordering on the Hoogly and the Jellinghy Rivers, so great was the mortality, that the bulk of the whole population was sensibly diminished by the dreadful ravages of the distemper. It is remarkable, that the large and populous city of Moorshedabad, from extent and local position apparently very favorably circumstanced for the attacks of the Epidemick, should have escaped with comparatively little loss, whilst all around was so severely scourged.

Burrisaul.  
Burdwan.  
Rungpore.  
Malda.  
Chupra.  
Tirhoot.  
Buxar.  
Ghazeepoor.

Moorshed-  
bad.

It has already been shewn, that, so long as the Epidemick was confined to the Province of Bengal, it at once raged simultaneously in various and remote quarters, without displaying a predilection for any one tract or district more than for another ; or any thing like regularity of succession in the chain of its operations. As yet too, some of the peculiarities subsequently developed by it, and so unerringly marking its progress throughout the Upper Provinces, that they came almost to be considered as laws of the disease, had either not been called into existence,

or were still of such feeble and uncertain operation, as to remain unobserved among the accumulated horrors of its attacks. Thus, although there was the same violence in the commencement, and rapidity in the progress, of its visitations, they were yet unmarked by that earliness of declension, and entire subsidence, which afterwards generally formed so consolatory a part of their revolutions.—Nor could a town or tract of country, after having once fully undergone the scourge, yet congratulate itself on a probable immunity from its further assaults.—For, although generally milder in form, and less fatal in the latter period of its existence, it rarely altogether disappeared ; but seemed rather to keep hovering in the vicinity, as if in mere expectancy of some fresh cause to recommence its attacks with renewed vigour.

The only spots on the Eastern side of the Ganges, beyond the precincts of Bengal, attacked by the Epidemick in the Autumn of 1817, were Moozufferpore, and Chuprah, the principal Stations of the Tirhoot and Sarun Districts ; and the cantonment of Ghazeepore ;—and in each of these places its attacks were confined to the towns themselves, or villages in their immediate vicinity : the great bulk of the adjoining country, at this period, entirely escaping the disease.

And now the Epidemick began to shew one of the most striking peculiarities which characterised its march. It no longer pushed its influence, without distinction or apparent choice, in all directions, and throughout every tract coming in its way. It began to affect particular lines, and to fix itself in particular divisions of Country ; wholly restricting itself for the time to the course of those lines and divisions. Instead of shooting up from Moozufferpore, Chupra, and Ghazeepore, through the contiguous districts of Gorruckpore and Jioanpore, to the provinces of Oude and Rohilkund, it wholly left that part of the Country ; and for many months confined itself to the tracts lying west of the Ganges and Jumna. Thus, from the beginning of November, when it quitted Moozufferpore, until the end of March, when it broke out in Allahabad, on the junction of the Ganges and Jumna, it does not appear, that any one spot of the immense tract stretching to the East of these rivers from the northern point of Saharunpore to the Southern boundary of Tirhoot, was visited by the disease.\* It will be afterwards seen, that from Allahabad, a new stream of the pestilential virus, now apparently propagated by regular succession, issued in various directions, and made a great part of this tract suffer for its previous immunity.

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\* Lucknow may perhaps be brought forward as an exception to this general rule. A few cases of Cholera

Mirzapore.

Although the Epidemick would seem to have beset Zila Mirzapore, and to have slightly appeared at Oonchara, and in the Camp of His Majesty's 17th Regiment of Foot, and of the 2d Battalion 8th Regiment Native Infantry, at Mongawa, near the Northern extremity of Rewa, about the middle of November; it did no great mischief, until in the end of the first week of that month, it reached the Centre Division of the Grand Army, then encamped, under the personal command of the MARQUESS of HASTINGS, near the banks of the Sinde in Bundlekund.

It was here that the disease put forth all its strength, and assumed its most deadly and appalling form. It is uncertain whether it made its first approaches on the 6th, the 7th, or the 8th of the month. After creeping about, however, in its wonted insidious manner, for several days among the lower classes of the Camp followers; it, as it were in an instant, gained fresh vigour, and at once burst forth with irresistible violence

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Morbus did certainly appear there in December and January; but these were probably merely Sporadick; as the disease afterwards visited the City with great violence in April and May, when it was prevailing epidemically in the neighbouring Country. So that, if the cases occurring in December belonged to the Epidemick, the City must have been twice visited by it; a thing almost unknown during its stay in the Upper Provinces.

Rewa.  
Bundlekurd.  
Centre Divi-  
sion of the  
Army.

in every direction. Unsubjected to the laws of contact and proximity of situation, which had been observed to mark, and retard the course of other pestilences, it surpassed the plague in the width of its range ; and outstripped the most fatal diseases, hitherto known, in the destructive rapidity of its progress. Previously to the 14th, it had overspread every part of the Camp ; sparing neither sex nor age in the undistinguishable virulence of its attacks. The old and the young, the European and the Native, fighting men and Camp followers, were alike subject to its visits ; and all equally sunk in a few hours under its most powerful grasp. From the 14th to the 20th or 22d, the mortality had become so general, as to depress the stoutest spirits. The sick were already so numerous, and still pouring in so quickly from every quarter, that the medical men, although night and day at their posts, were no longer able to administer to their necessities. The whole camp then put on the appearance of a hospital. The noise and bustle almost inseparable from the intercourse of large bodies of people, had nearly subsided. Nothing was to be seen, but individuals anxiously hurrying from one division of the Camp to another, to inquire after the fate of their dead or dying companions ; and melancholy groups of Natives bearing the biers of their departed relatives to the river. At length, even this consolation was denied to

them ; for the mortality latterly became so great, that there was neither time nor hands to carry off the bodies ; which were then thrown into the neighbouring ravines, or hastily committed to the earth, on the spots in which they had expired, and even round the walls of the Officers' tents. All business had given way to solicitude for the suffering. Not a smile could be discerned, nor a sound heard, except the groans of the dying, and the wailing over the dead. Throughout the night especially, a gloomy silence, interrupted only by the well known dreadful sounds of poor wretches labouring under the distinguishing symptoms of the disease, universally prevailed.\*—The Natives thinking that their only safe-

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\* Many of the sick died before reaching the hospitals; and even their comrades whilst bearing them from the out posts to Medical aid, sunk themselves, suddenly seized by the disorder.—Never was the impressive language of Scripture more applicable than now:—“*In the midst of life we are in death*”.—All security of life was gone; and as youth and vigour afforded no safety, even the healthiest man could not in the morning tell, that he might not be a corpse before night.—Such was the dreadful effect of the scene, that even long after its occurrence, it could hardly be described without shuddering by the eye-witnesses.—How fatal the sickness of this Division, had it continued much longer, might have proved in its political consequences, we have been told from the highest authority. In delineating the rise and progress of the late war, on his return to the Presidency, the Governor General thus spoke of the visitation of

ty lay in flight, had now begun to desert in great numbers ; and the highways and fields for many miles round, were strewed with the bodies of those, who had left Camp with the disease upon them, and speedily sunk under its exhausting effects. It was clear, that such a frightful state of things could not last long ; and that unless some immediate check were given to the disorder, it must soon depopulate the Camp. It was, therefore, wisely determined by the Commander in Chief, to move in search of a healthier soil, and of purer air. The Division, accordingly, on the 13th marched in a South Easterly direction towards Talgong, and Sileia ; and after several intermediate halts, on the 19th crossed

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his Army.—“ The dreadful pestilence, which made such havoc in the Division under my immediate command, forced me to quit the banks of the Sinde, and to seek a more favorable country for the recovery of my numerous sick. I did not find this until I was fifty miles from the river which I quitted.—Fortunately the change of air was rapidly beneficial ; for, a very short time had passed when I received intelligence of an invitation said to have been given by Scindia to the Pindarries.—He was reported to have promised them, that if they would come so near to Gwalior, as to make his getting to them easy, he would break his Treaty, and join them with the Force, which he had at his capital.—The Pindarries were in full march for Gwalior, without meeting even a shew of impediment from the troops of Scindia stationed in their route ; tho’ the co-operation of his Army for the extinction of the Pindarries was an Article of the Treaty.—

the clear stream of the Betwah, and upon its high and dry banks at Erich, soon got rid of the pestilence, and met with returning health. But its line of march, during the whole of this progressive movement, exhibited a most deplorable spectacle. Although every means had been taken, by giving up the ammunition carts, and collecting elephants and draught cattle, to procure sufficient carriage, the sick were found too numerous to be moved, and were in part necessarily left behind. And as many who left the carts, pressed by the sudden calls of the disease, were un-

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We hurried back to the Sinde; but this time we chose a position nearer to Gwalior, than what we had before occupied.—We were within thirty miles of the City, and our advanced guard was sent to occupy the passes thro' the hills which run at some distance South of Gwalior from the Sinde to the Chumbul.—Those passes were the only route by which communication could take place between the Pindarries and Scindia: and I was nearer to support my advanced guard than the Mahajah was to attack it, could he bring his mind to so desperate a stake.—The Pindarries finding their hopes baffled and the passage stopped, attempted to retire; but they had been followed close by our Divisions, were surprised, dispersed, and slaughtered in a number of small actions. In short they disappeared. And thus our objects were completed.”—A few days' longer continuance of the Epidemic might, by entirely crippling this Division, have given a very different appearance to the face of affairs, and prolonged the struggle to an indefinite period.

ble to rise again; and hundreds dropt down during every subsequent day's advance, and covered the roads with dead and dying; the ground of encampment, and line of march, presented the appearance of a field of battle, and of the track of an army retreating under every circumstance of discomfiture and distress. The exact amount of mortality during these few calamitous days could not, from the circumstances of confusion and general disorder, under which it took place, be ascertained with any degree of accuracy. From the Military returns however it appears, that in this fatal week, of 11,500 fighting men of all descriptions,\* 764 fell victims to the disorder; and of the camp followers, it was conjectured, that about 8,000, or one-tenth of the whole, was cut off.

From the Division having shaken off the disease, shortly after reaching the elevated and salubrious banks of the Betwah,† it was generally

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\* The number of fighting men in Camp is here good deal overrated; for one Detachment left Camp before the commencement of the disorder; and another much larger as early as the 18th.—The two together amounted to nearly three thousand.

† The disorder ceased to be Epidemick about the 22d or 23d. A few instances of mild attacks were after that seen daily till the end of the month. After the 8th of December not a case appeared.

believed, that it owed the recovery of its health solely to its change of ground and climate. But, without denying the salutary effects of such change, it may be reasonably doubted, whether the Epidemick could have existed much longer in Camp, even had it remained stationary on its original scite. For from this time forward, it began to evince that rapidity in its revolutions, and inaptitude to remain long in one place, which almost invariably characterised its future progress; and as will be hereafter seen, in no one of the several camps subsequently visited by it, did it continue in full vigour for more than ten or fifteen days.

The Medical Staff attached to the Centre Division are quite divided in opinion, regarding the particular source of the Epidemick in that quarter. According to some, it commenced, so soon as the 2d of November, at the bridge of boats at Sheergur, over which the army crossed, in passing from the Doab in the end of October; and was thence communicated to the Camp at Terayt, by the Detachment left to guard the *tête de pont*. It will afterwards be attempted to be shewn, how far this conjecture was borne out by facts. A second opinion was, that the Division found the disease in the villages, on its route from the Jumna; and a third, supported by an almost equal number of voices, that it sprung up spontaneously, from some unknown cause, in the centre of the Camp itself; and was thence imparted

Sheergur.

ed to the previously healthy towns in the vicinity. The probability seems to be, that the peculiar vicious state of the atmosphere, productive of the disease, which had several months pre-existed in Lower India, was already beginning to reach the Upper Provinces; and that, although not yet in sufficient force, to be called into activity by the comparatively slight causes afterwards sufficient for its excitement; it was nevertheless capable of being roused by the numerous circumstances favorable to its existence, presented by the immense body composing this Division of the Army.

Be this as it may, it is quite certain, that after appearing in this quarter, the Epidemick, still avoiding the Eastern and Northern parts of the country, now decidedly took a South Westerly direction; and, after being propagated along the beds of the principal rivers and great roads, to almost every town and village of Bundelkund and Saugor, was successively communicated to the provinces of Berar, Malwah, and Khandeish, and finally to almost every portion of the Deccan.

1818.

Sangor.  
Berar.  
Malwah.  
Khandeish.

No reports having been received from the northern part of Bundelkund, it is impossible to trace its progress through that division of the district.—In the South its route may be more easily sketched.—Having stretched from Jelalpore, on the Betwah, to the town of Kytah, and overrun the Kytah.

**Banda.**

whole of the tract between the Dusawn and Cane rivers, it reached Banda in the end of March. There, and in the dependent district, it is reported to have destroyed 10,000 of the inhabitants. We now find it proceeding in a westerly direction, along the banks of the Cane, to Lohargaon, Hutta, and Saugor ; in which neighbourhood, it remained with great virulence from the beginning of April till the middle of May. But though the inhabitants of Hutta and Saugor, and the dependencies of Nursingha and Puthoorea, smarted exceedingly under its inflictions, it is curious, that the troops serving in that quarter, and some of them living in the very centre of the pestilence, at that time, scarcely appeared subject to its influence.

**Nursingha.  
Puthoorea.****Nagpore.  
Bhilsa.  
Bhopal.  
Ougein.****Mow.****Muhedpore.****Bhanpora.**

From Saugor the virus diverged in two directions. One stream took a Southerly course towards Nagpore. The other went South West through Bhilsa, Bhopal, and Shoojawulpore to Ougein : doing infinite mischief in the whole of this line ; and, as it proceeded, taking in the post of Burseeah, and Sir John Malcolm's Camp at Mow. It reached Jhanoor, three marches South of Ougein, on the 4th of May ; was at Ougein itself on the 9th ; and at Muhedpore on the 12th. Thence, still keeping to the course of the Chumbool river, it successively attacked Sonara, Major Agnew's detachment at Bhanpora, and the camp of Holkar in the immediate vicinity. In June

it had got the length of Kotah; where it is said to have cut off a hundred men a day, and to have produced such dismay, that the inhabitants were abandoning the city in distraction. Having here, however, got into the high and mountainous tract, which has invariably been found inimical to its existence, it seems now to have gradually died away. A proof of this is, its never having reached the States of Oodleypoor and Ajneer.

To return towards Saugor, and to trace the current, which was stated to have taken a Southerly course; and, which, after affecting the Left Division of the Army, and the Nerbudda Field Force, would appear to have extended through the States of Nagpore and Poonah to the Presidencies of Bombay and Madras:— The troops under Major General Marshall, during their march in a South Easterly direction from Saugor to Mundela, fell in with the disease, on the 9th of April, at Jubbulpore on the Nurbudda; and suffered severely from it during the remainder of the month. The mortality caused by it, however, amongst the regular troops, bore no proportion with that, which had previously occurred in the Centre Division: for of 8,500 fighting men, only 125 were taken ill; of whom no more than 49 died.

*Left Division  
of the Army.*

*Jubbulpore.  
Mundela.  
Nurbudda.*

Following the channel of the Nerbudda, in an

**Hoshungabad.** Easterly direction, the disease next gained Hoshungabad ; and, apparently crossing the river at that place, proceeded in a Southerly course, through the town of Mooltay, to the city of Nagpore, where it arrived in the last week of May. Both of these places, and many of the villages intermediate between Hoshungabad and Mooltay, were very severely visited by it ; and Mooltay itself, although but an inconsiderable place, lost above five hundred of its inhabitants. But, so singularly capricious was the disorder in this quarter, that it was not met with between Nagpore and Mooltay ; a distance of 70 miles ; and that Baitool, a large town in the direct road from the river to Mooltay, was entirely exempt from its visitations.

**NagporeForce** The Nagpore Subsidiary Force under Colonel Adams, afforded the first striking instance of a large body of men coming into the pestilential medium, and from the previous enjoyment of perfect health, falling at once into a wretched state of sickliness. This Division had, during the early part of May, been occupied in besieging the important Fortress of Chanda ; but, although it had undergone excessive fatigue, and met with a few casualties from constant exposure to the sun, it had nothing like marked disease, until, on the morning of its last march on the return to Nagpore, it encamped at Gaongong : a village situated nine miles South of the city.

**Gaongong.**

Here it had hardly learnt, that the Epidemick was raging in the vicinity, when it began itself to experience its unwelcome visits. As usual, its first assaults were most severe. Many of those attacked, whilst loitering for water in the neighbouring rivulets, were brought in expiring ; some dead. Of 70 cases admitted during that night and the succeeding day, about 20 died.—On the 31st the instances of attack were equally numerous ; but in these, the exhaustion was not so sudden, and the subsequent symptoms were less severe. On the 1st of June, the Division moved from Nagpore towards the cantonments at Hoshungabad. The disease then gradually declined ; and almost entirely disappeared on the 17th and 18th, after some seasonable falls of rain. The Madras Troops, composing part of the besieging force employed at Chandah, are reported to have suffered equally with their comrades from this side of India.

As the Bengal returns proceed no further than Nagpore, it must be left to the proper authorities at the other Presidencies, to give an accurate record of the ravages of the Epidemick, as it stretched through the Deccan, and ranged along the Malabar and Coromandel Coasts\*.—It may here,

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\* This has been already in part done. A Report has been issued by the Bombay Medical Board ; and is full of valuable facts. It will soon be followed by a corresponding paper from Madras, where the Epidemick has been very generally destructive. \*

however, be generally mentioned, that, according to the prevalent opinion, the disease could be distinctly traced along the great road leading from Nagpore to Jaulna, and thence to Aurungabad and Ahmednuggur.—From this quarter, or perhaps from Chandore, and Nassuck on the Godavery, it was communicated to Bombay.

Jaulna.  
Aurungabad.  
Ahmednug-  
gar.

Poona.  
Bombay.

—The city of Poona, and many of its dependent towns and villages, the province of Khandeish, the camps of Generals Doveton and Smith, and of Colonel McDowal, were visited by it in the course of July and August ; and at Punderpoor, where it happened to shew itself during the celebration of a great fair, it is said to have laid low upwards of three thousand victims. It certainly penetrated to the southernmost point of the Peninsula\* ; and even passed over to the Island of Ceylon ; but, during the latter part of its progress, its course was singularly uncertain and erratic, and its symptoms fortunately much mitigated.

Allahabad.

We must now trace back our steps, and follow the Epidemick, during an almost equally long and devious path, which it pursued, from the junction of the Ganges and Jumna at Allahabad, through the greater part of the Northern Provinces. This point is fixed upon, because

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\* It swept through Mysore in the following Cold Weather ; and in the city of that name alone, cut off ten thousand persons.

the disease first established itself there in the spring of 1818, and could thence be distinctly traced successively to many of the Towns situated in the Doab, and on the Western bank of the Jumna. It broke out suddenly in the town and district of Allahabad in the end of March; and prevailed during several months with great malignancy : sweeping off nearly 10,000 of the inhabitants. The troops stationed in the Fort and City were not affected until the middle of July following, although holding daily and unrestrained intercourse with the townspeople.

Keeping close to the banks of the Ganges, the Epidemick entered Cawnpore on the 8th of April ; having previously visited the town of Nujugur, lying about 18 miles East of that City. It equally attacked the City, the Military Cantonnements, the Civil Station of Bethoor, and the adjoining villages ; and remained in full force during fifteen or twenty days. But, the mortality caused by it was not very great, and it appeared little disposed to extend far in that direction : Bareilly, Moradabad, and almost every other town in the same line enjoying their wonted health. The town and district of Shajehanpore form a remarkable exception to the general healthiness of the Province of Bareilly. There, the disease appeared in July, and is reported to have killed upwards of five thousand of the inhabitants.

Cawnpore.

Nujugur.

Bethoor.

Shajehanpore

**Etawah.**

**Futtigur.**

**Muttra.**

**Agra**

**Coel.**

On the Jumna, the Epidemic spared Culpee, and almost every intermediate village between it and Etawah.—The latter place it reached late in May; and, after doing considerable mischief, it would appear to have thence at once stretched across the Doab to Futtigur, visiting very few places on its route. It appeared in the lines of Futtigur on the 10th of June; and thence was communicated to the town. There it shewed little virulence of symptoms; and wholly subsided on the commencement of the Rains early in July. It is curious, that Muttra, situated considerably higher up the Jumna than Agra, should have had the disease in the beginning of June, whilst the latter place was not visited until the 1st of July. In Muttra,—a filthy and crowded City,—the disease was very virulent, and the mortality great. In Agra,—a dry and airy town,—the symptoms were mild, and the deaths few. The Cantonments attached to Agra remained nearly exempt; but those at Muttra being low and near the banks of the river, partook of the general unhealthiness of the town, and lost many men. In both places, the Epidemic loitered for more than a month. It then, on the 11th of July, entered the town of Coel; which was alone affected in the Alligur district: the Jails, Cantonments, and the adjoining villages enjoying perfect immunity. We next find

the disease on the 20th at Delhi. Here it remained <sup>Delhi.</sup> nearly a month, and committed very considerable havoc among the condensed population of an extensive city.

Neither between Agra and Delhi, nor during its route from the latter place to Meerut, did the disorder halt in any of the intermediate towns and villages. Since, of these many were placed very low, and much exposed to masses of animal and vegetable putrefaction, and every other source of miasmata and contagion, their immunity from attack could hardly be ascribed with justice to peculiar healthiness of situation. The reason rather seems to have been that, in this quarter, the Epidemick, whether from the pure and elastic air of the Northern Provinces being less favorable to its existence, than the thick damp climate of Bengal ; or from its beginning to give way to that general law of Nature, which requires that diseases, like all other things, should have their decrements, as well as their rise and increase ; or from some other hidden agency altogether unsuspected, was now beginning to die away, and could only be kept alive by strongly exciting causes : such as large bodies of men crowded together in Camps and Cities. Hence, we find, that between Delhi and Meerut,—a distance of thirty miles, populous and studded with considerable towns and villages,—not a case of the dis-

**Meerut.** Ease occurred ;\* whilst the latter City, and the Cantonments attached to it, suffered under it from the 28th of July to the 20th of August. Few were seized in the town, and fewer in the lines ; and in both the sum of mortality fell considerably short of three hundred. So likewise, **Saharunpoor.** between Meerut and Saharunpoor, the Epidemick kept dormant ; whilst the latter City, which is very low and filthy, filled with ruined buildings, and intersected by foul channels with oozy banks, suffered considerably. The disease shewed itself in the town about the end of September ; was in full force about the middle of October ; and declined from that time until the last week of the month, when it wholly disappeared. It may be, however, that the virus proceeded not in a centrical line from Delhi to Saharunpore, but along the course of the Jumna ; as Tannah, a large town, only sixteen miles from the river, and twenty South of Saharunpore, was attacked before the latter place.

**Tannah.**

The Epidemick cannot be traced farther North than Saharunpore. The high ridges of mountains, which in other quarters proved hostile to its propagation, here opposed its further pro-

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\* By a subsequent report it indeed appears, that the Epidemick slightly visited the towns of Ghazeeabad and Mooradnuggur ; but in them the cases were so few as hardly to affect the statement in the text.

gress ; and saved the inhabitants of the hilly districts from a scourge, which, in their circumstances of poverty and nakedness, would probably have proved exceedingly fatal to them.

On the 23d of July, a Detachment, consisting of a troop of the Horse Artillery Brigade, the <sup>Hansi Division</sup> on. Rocket troop, and 5 Companies of the 1st Battalion 25th Native Infantry, marched from Meerut to join the force collecting at Hansi under Brigadier Arnold, for service in the Bickaneer and Bhatty countries. They remained perfectly healthy on their march to the Jumna, and during several subsequent days, in which they were encamped on its East bank. On the 29th they crossed the River, passed through Delhi (the disease being then at its height in the town) and encamped outside of its walls, about a mile to the West. On the 30th, they continued their March in a North-westerly direction ; and on the morning of the 31st, they were attacked by the Epidemick.—It continued unabated amongst them, until the 6th ; when they joined the general camp at Hansi. Although one or two cases <sup>Hansi.</sup> had occurred in this Force a day or two previously to the arrival of the Meerut Detachment, it was the unanimous belief of the Medical Staff serving with it, that from the latter, it got the disease in its epidemical form. What gives a colour of probability to this conjecture is, that the

disorder was not met with in any of the villages lying in the immediate line of the route of the Detachment from Delhi to Hansi ; and certainly did not appear in the latter town until some time after its prevalence in Camp, and then but very slightly.—On the other hand, it was generally rumoured that, several intermediate places between Delhi and Hansi, and between Delhi and Kurnaul, particularly Paniput, had been affected previously to Hansi being brought within the pestilential influence. It continued with the troops until the 12th of August; and accompanied them in their march in a W. N. W. direction to Futtihabad, Rhauneea and Sirseea, and in their retrograde movement on Hissar. Of the whole Force, only about 250 men were attacked. The symptoms were comparatively mild; and the deaths few. The Epidemick did not reach Loodeehana; and appears in this quarter to have been limited by the river Sutledge.

Kurnaul.  
Paniput.

Hissar.

Jeypore.

From Dehli or Aligurh the disease would seem to have spread in a South West direction to the principality of Jeypore ; the capital of which it reached in the latter end of August. Here it was neither malignant, nor general : its attacks being almost confined to the most wretched class of the inhabitants, and the whole mortality throughout the circumjacent country scarcely exceeding a thousand men.—On the

12th September it began to abate in the city ; and on the 14th it entered the camp of a detached Force commanded by Major Agnew, at Titirya, twenty-five miles South West of Jey-pore ; and there raged with very considerable virulence till the 28th, when it gradually abated. Of 96 Europeans, and 4100 Natives composing the fighting part of this Force, the admissions were 292, of whom 122 died. The mortality amongst the camp followers could not rightly be ascertained. The Epidemick was no more heard of in this direction : neither the town, nor the valley of Ajmeer being affected ; although another large division of the Rajpootana Force was encamped in the latter, on similar ground, and under circumstances apparently in no wise differing, from those of their less fortunate comrades at Titirya.

Rajpootana  
Force.

Having now gone round the circle described by the disease, and marked those places which had most reason to remember its unwelcome visits, we might bring this Sketch to a conclusion. Previously, however, to taking leave of this part of the subject, it will be necessary to advert shortly, to the appearance of the disorder in some parts of the Middle Provinces, which in point of time, or of the source whence the virus was communicated to them, could not well be ranged under any of the foregoing divisions. .

It has been stated that, towards the end of September, the Epidemick appeared in the town

of Chupra and Moozuffurpore; but that, at that time, the range of its operations in this quarter was extremely partial, and almost confined to those towns themselves, and the villages in their immediate vicinity. It, however, re-appeared in May,

**Tirhoot.** and spread with extreme virulence over the whole district of Tirhoot; causing a mortality computed at nearly ten thousand men, and subsiding only with the full setting in of the Rains. It would appear to have extended through the Tirace, and to

**Mulleye.** have affected the Military Cantonment at Mulleye with considerable severity. At the same time, the city of Benares was attacked, but with comparative

**Benares.** lightness, considering the extent and crowded, close nature of the town. Jionpore, Sultanpore (Oude), Gorruckpore, Oude, Fyzabad, Lucknow,

**Juanpoor.** and other places situated near the Gogra and Sooltanpore.  
**Gorruckpore.** Gomtee rivers, were successively attacked in Oude.  
**Fyzabad.** April and May. In Lucknow and Fyzabad it  
**Lucknow.** did much havoc; and the inhabitants of Gorruck-

pore in the end of April suffered so greatly, that they quitted the city and sought for safety in the adjoining villages and groves.—The Troops and camp followers in personal attendance upon the Governor General, on his return from the Upper

**Governor General's Camp,** Provinces, again fell in with the Epidemick on the 20th, or 21st, of April; but now its attacks were nearly restricted to such persons as had not been with the Centre Division of the Army in the preceding autumn.

. In the foregoing pages the singular fact of the virus shewing an unwillingness to ascend high and mountainous tracts of Country, has been noticed.—Thus it wholly avoided Kumaoon, the Hilly Districts North of Hurdwar, and the elevated stony belt which girds in the Rajpootana States to the North West.—But this rule was not without exception ; for, in June it passed the lofty range of mountains guarding Napaul to the East, and visited Khatmandoo, Patun, and Bhatgoon in the subjacent valley ; and, in October following, it got from Sylhet to the independent countries of Kashar and Munnipore, on the eastern borders of Bengal. But, even here, it might be seen, that high lands were not congenial to it ; for it had been raging with very great violence in the adjoining District of Sylhet, before it was enabled to overcome the obstacles opposed to its progress by the intervening mountains.—The same causes may be assigned for its partial occurrence among the Ramgur and Sirgooga Hills ; whilst Soncpoor and Sunibhulpore were largely affected : apparently from Cuttack, along the course of the Mahanuddee.

Such was the course of this singularly erratic and destructive malady.—Whether the virus, having put forth all its strength in its progress through these provinces, has nearly worn itself out ; and may now be considered, as about wholly

to disappear ; or is yet existent in a dormant state, merely waiting for some favorable moment again to spring up with renewed strength in this, or some other country hitherto unvisited, it is not in the power of man to tell.\*—From the

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\* As no more favorable opportunity will hereafter occur, a few particulars may be here mentioned regarding the times of appearance and periods of duration of the Epidemick during its stay in Bengal.—It has been stated in the text, that it first broke out epidemically in Calcutta in August 1817; and that it continued prevailing in the city, with more or less violence, till the ensuing August. From that time until the following April, when it recurred with considerable violence on occasion of some variable, unseasonable weather, only a few cases came to notice. Now (May) it has again subsided ; but fresh instances of the malady are sure to occur, as a consequence of the sudden vicissitudes in the atmospherical heat and moisture, produced by every North Wester.—It has probably observed a like course in JESSORE ; but its progress there cannot be exactly learnt, in consequence of the absence of a Medical Officer from that station for many months.—It appears, however, that since the beginning of the present year it has been constantly in existence, and destroying many persons in the North and Eastern parts of the district.—In the Backergunge district it remained until the end of last year, since which time it would not appear to have done much injury.—In Bullooah and the tracts near the mouth of the Ganges, it began in February, and terminated in June, 1818.—In different parts of Mymensing it has existed since June, 1817. So likewise in the city and District of Dacca.—In Tipperah, after

disease, however, still continuing now and then to visit Calcutta and many other places in Bengal, although in an infinitely less degree than

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wholly disappearing during the Cold Season, it returned in March 1818; and remained till the breaking up of the subsequent Rains, from which time it seems again to have retired.—In Sylhet its career has been singularly various. After retiring in October 1817, and being for several months dormant, it returned in the end of March, and subsisted till the setting in of the Rains, when it a second time nearly disappeared. But, about the middle of October, it suddenly increased all over the district to as great a degree, and with greater fatality, than on its first appearance. It gradually declined in December, and again withdrew in the end of the year. Finally, it made its fourth visit in the commencement of the present Hot Weather; but not generally.—In Rajshahy, it prevailed most in September and October; and disappeared about the middle of November, 1817. It again appeared in the following Hot Weather, and frequently proved fatal.—It commenced in August in the city of Moosbedahad, and has continued till now; but always in a very mild shape.—In Nuddea, as we have seen, it began generally in July and August. Towards the latter end of the year, it became less severe. With the heavy rains, which set in towards the end of the following February, it recurred in various parts of the District. As in Calcutta, it declined in August following, was very rare in the cold months, and again got head in the beginning of the present Hot Weather.—In Burdwan a few cases happened early in the Rains. In September the mortality caused by it was alarming; and, from that month until the end of the following year, few days passed without the disease appearing in some of the

formerly, it is to be feared, that the atmosphere has not regained its natural salubrity ; and, that such a continuation of unseasonable weather, as

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villages. It was particularly violent in the commencement and at the termination of the Hot Winds. Since January 1819, no account of its progress in that quarter has been received.—In the district of Bhaugulpore it continued its ravages, without intermission, from August 1817, to May 1818, when it considerably abated ; and from that time till now only occasional cases have occurred.—At Monghyr it began in the latter end of August; decreased in October and November; was not heard of in December; recurred partially in January and February; increased much throughout the Hot Weather; and finally altogether withdrew in September. In Behar it began in August; nearly disappeared in the Cold Season; recurred about the 20th of February; and continued active till the ensuing November; when it again nearly ceased; to reappear in March and April. Of late the disorder has appeared much in the South West parts of Bengal, visiting severely Midnapore and Cuttack, which it almost spared in the early parts of its course.—But it must not be supposed from the foregoing statement, that the disease now rages with that width of range, or generality of attack, which it took in the first year of its existence. In Calcutta certainly, and probably in almost every other part of the Lower Provinces, it is no longer strictly Epidemic. The case is this. A disposition to produce the disorder still exists in the atmosphere. This is brought into play by sudden alterations of the weather. Then perhaps a dozen of cases, and two or three deaths occur; the Settlement is immediately thrown into alarm; and it is generally rumoured, that the cholera is more prevalent than ever. The truth neverthe-

has been seen to have preceded the first irruption of the Epidemick, is only required to renew it in its pristine strength.

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less, is that more individuals probably perished from the disease in one day in the autumn of 1817, than now do in a quarter of a year. It should, moreover, be recollect-  
ed, that the disease is endemical in Bengal in the sultry periods of the year; and that were it not for the present scared state of the public mind, the few cases now occurring might, as in former years, pass nearly unnoticed. As it is, all is magnified by apprehension. As is quaintly observed by one of the Medical Staff, "the disease, like some foul fiend is still wandering to and fro, and like the author of all mischief spreads universal terror before it."—The disorder having in April severely attacked several detachments of troops marching through the Cuttack and Midnapore districts, a notion was entertained, that there was something in the vicinity of the Soobanrecka river, which divides these tracts near Balasore, connected with, and immediately leading to its rise. But this was quite a mistake; for it was learnt upon enquiry, that the several divisions got the disorder equally readily in different parts of Cuttack; and that it always broke out after a fall of rain, or other mani-  
festly strong exciting cause. Besides, that the Epidemick has been long known at Balasore, and had visited several detachments in the Cuttack jungles so far back as the Cold Weather, and Juggurnath lines in the spring of the preceding year.

## SECTION II.

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### OF THE SYMPTOMS OF THE DISEASE.

A VOMITING and purging of a pale and watery fluid, either concurring or alternating with each other, formed the leading symptoms of this disorder.

The attack was generally ushered in by a feeling of fulness and pain in the stomach, and swelling of the abdomen ; with sickness, and a desire to go to stool. Then came, almost immediately, vomiting and purging of a pale, thin fluid, without taste or smell ; great anxiety ; oppression, and sense of constriction about the heart and praecordia ; thirst and internal heat. These symptoms were accompanied, or quickly followed, by severe cramps ; generally beginning in the fingers and toes, and thence extending to the wrists and fore arms, calves of the legs, thighs, abdomen, and lower part of the thorax.

Together with these signs of general depression, the action of the heart and arteries, was uniformly diminished. The pulse sunk rapidly at the wrists, and temples ; and at last could no longer be felt, or was merely perceptible by a

slight and indistinct fluttering. The respiration became laborious and hurried, with sighing, and long and frequently broken inspirations. As the blood forsook the extreme vessels, and withdrew to the great cavities, the exterior surface of the body grew pale, shrunken, and cold. The skin became clammy, dank and disagreeable to the feel; bedewed with large drops of cold sweat; and discoloured of a leaden, bluish, purple, or livid hue. The countenance was greatly changed; the features were contracted, collapsed, and ghastly.—The eyes sunk in their sockets; fixed and glassy; covered with a thick film; heavy; dull; suffused; and surrounded by dark brown or black circles.—The lips livid, or of a purple colour.—The finger nails blue; the palms of the hands white, bleached, and pucker'd into folds.—The mouth was dry and parched; the tongue bluish, or white and faltering; and the voice hoarse and low.

There was sudden and great prostration of strength.—The hands trembled; and the action of the voluntary muscles was uncertain and unsteady.—The patient could no longer stand or walk without assistance: He became as feeble as a child; staggered like a drunken man; and unless supported, sunk down like one in the last stage of debility from fever.

In feeble habits, and where the disease attacked in extreme violence, the scene was soon closed.—The circulation and animal heat were never restored.—The spasms, vomiting, and purging were frequently renewed—The thirst continued incessant and unquenchable; and was no sooner gratified by draughts of water, or other fluid, than dreadful retching ensued.—The burning heat, anguish, agitation, and restlessness continued unabated. At length, the patient, exhausted by the depressing influence of the malady, and the repeated large discharges, fell into a listless state; and had no longer strength for either full vomiting or purging. A little fluid was now only rejected by the mouth, as the abdominal muscles were thrown into spasm; or passed off involuntarily downwards, as the body turned round in bed.—The patient remained deadly cold; grew weaker and weaker; and insensibly sunk into death; or was carried off during a repetition of spasms: sometimes in one, but more frequently within four, six, or twelve hours.

Such was the general appearance of the disease, where it cut off the patient in its earlier stages.—This state of collapse, sometimes however, lasted much longer before it ended in death: which it almost certainly portended. It was often attended by a remarkable degree of listlessness. The patient seemed wholly unaware of his ex-

• tremie danger; or quite careless of its consequences. He wished to be left to himself; and the spasms having now ceased, he lay motionless; being only roused at long intervals, as the sickness recurred, or as his thirst reminded him to call out for water: The amazing eagerness with which he seized the vessel, and gulped down the fluid, when he knew it would be followed by instant vomiting, shewed how all was burning within.

Much variety, however, occurred in the kind, order, and sequence of the symptoms; according as the virus of the disease happened to be more or less concentrated, or the individual affected of a strong or feeble constitution. Vomiting was the symptom of earliest and most frequent occurrence. Next came purging; then the cramps, and spasms. Frequently, however, this order was reversed, and the purging and spasms took the lead of the vomiting. Sometimes the cramp preceded both. Sometimes there was no vomiting; sometimes no purging; sometimes no spasm, throughout. Sometimes all these symptoms were simultaneous; and the vomiting and purging took place together, as if caused by sudden contraction of the alimentary canal in its whole extent. In some rare instances, the virulence of the disease was so powerful as to prove immediately destructive of life; as if the circulation were at once arrested, and the

vital powers wholly overwhelmed. In these cases, the patient fell down, as if struck by lightning ; and instantly expired. Others, again, sunk after making one or two feeble efforts to vomit, and drawing a long and anxious inspiration. Some recovered from the insensibility produced by the first shock, and afterwards went through the regular course of the disease.

The irritability of stomach, and vomiting, formed a very distressing part of the disorder. They were generally preceded by a feeling of giddiness and inclination to faint ; by fullness, tension, uneasiness and pain, especially about the pylorus ; as if the contents of the stomach were in vain soliciting a passage into the duodenum. The fluid rejected was watery ; mostly tasteless ; transparent ; or of a whey or ash color. Sometimes, it was sour ; green ; dark like infusion of tea ; starchy ; mixed with mucus, and viscid. In very rare instances, where the vomiting was excessive or kept up for many hours, pure bile was thrown up ; but the disease was almost universally characterised throughout its progress, by a total absence of this secretion from the whole course of the alimentary canal. Sometimes, the food last taken in was thrown up before the commencement of the watery discharges ; but this was not usually the case ; for, frequently, after death, indigested lumps of ingesta were found floating in the

- stomach ; clearly proving, that the action of that organ, however inordinate, was not always complete, or sufficient for its entire evacuation. The vehement, insatiable thirst always present, tended greatly to aggravate the irritability of the stomach ; for it was hardly possible to keep the patient from drinking large draughts of cold water, which were no sooner swallowed, than they were rejected with a quantity of phlegm or whitish fluid like gruel, solution of starch, or seethings of oatmeal. The vomiting proved by far the most intractable symptom of the disease ; generally keeping up long after the looseness and spasms had subsided ; and, even in cases which terminated favorably, harrassing the patient, and retarding his recovery, during many days.

The dejections were much of the same nature with what was passed upwards ; generally watery, colourless, white or muddy ; sometimes red and bloody ; sometimes greenish and pulpy, like half digested vegetables. To those, who have not seen persons labouring under the disorder, it will not be easy to convey an idea of the enormous extent of these discharges. It seemed as if the whole fluids of the body would have been insufficient for their supply ; and, that they very sensibly diminished the mass of the blood, was shewn by its thickness, and unwillingness to flow upon a vein being opened ; and by the

check uniformly given to all the secretions. The evacuations were sometimes poured forth in a rapid and continued stream, as if from a sluice ; at other times ejected in small volume, as if from a syringe, by the violent action of the stomach and rectum. In no instance, was forcible or bilious matter passed off in the commencement of the attack.

The spasms usually began in the extremities, and thence gradually crept to the trunk ; sometimes, they were simultaneous in both ; and sometimes, the order of succession was reversed : the abdomen being first affected, and then the hands and feet. They seldom amounted to general convulsion ; but seemed rather affections of individual muscles, and of particular sets of fibres in those muscles ; causing in them quick thrilling and quivering, and firmly stiffening and contorting the toes and fingers. In old men, and in persons of feeble habit, they were generally slight, and hardly perceivable by the eye of a bystander. Among Europeans, and among Natives of robust make, they were more severe. With them the bellies of the gastrocnemii sometimes became as firm and stiff as a board ;\* and hard

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\* Galen has noticed the greater violence of the spasms in this set of muscles. In his 5th Commentary on the Aphorisms of Hippocrates, he says, “ Convulsive contractions frequently occur in those affected with Cholera ; more especially of the muscles of the calves of the legs.”

knots could be felt in the fleshy parts of many other muscles. The torture caused by these contractions was exceedingly great. The patient always complained of pain across the belly; which was generally sore to the touch, and swelled from the scrobiculus cordis to the pubis; sometimes hard knotted, and drawn back towards the spine.\* The burning sensation of the stomach and bowels was always present; and at times extended along the cardia and œsophagus to the throat and mouth. When the stomach itself was seized by spasm, the pain was excruciating; and the patient screamed violently, and kept constantly tossing about. In some instances, the extreme violence of the spasm seemed in an early stage of the attack to destroy the nervous energy, and deprive the alimentary canal of all feeling; so that fluids of the most acrid and fiery nature passed down without producing the slightest sensation. The diaphragm frequently partook of the convulsive action; and gave rise to pain in the back and loins, and to severe hiccough, which shook the whole frame of the patient, and proved exceedingly distressing. Spasms of the intercostals and muscles of the neck were hardly ever seen; but partial and complete trismus was not of very rare occurrence.

\* In some rare instances the spasms were general, and as violent as in tetanus, so that the patient could scarcely be secured by four or five people. In one very athletick man, the bleeding fillet burst, from contraction of the muscles of the arm.

The disturbed state of the circulation was an early and ever present feature of the disease. Almost immediately after the stomach became affected, the blood forsook the surface of the body; and rushed in to the heart and great cavities. This was proved by the lividity and icy coldness of the surface; by the heat of the praecordia; by the throbbing felt about the heart, and great vessels; and by the dissection of those who died of the disease. The smaller arteries soon ceased to act; and the heart performed its functions imperfectly, and with great apparent difficulty. The hurried respiration, tossing, anxiety, and frequent sighing and moaning, which invariably succeeded, were probably in part produced by the accumulation of blood in the chest; and by the ineffectual efforts of nature to restore the balance of the circulation, by propelling it to the extremities.

The participation of the heart and arteries in the general derangement of the system was not, however, in all cases immediate or uniform. Sometimes, they seemed to be but little affected; and the pulse could be felt beating regularly, and of good volume, long after the irritability of stomach, and frequent spasms had evinced the violence of the disease. More generally, however, the action of the heart was speedily diminished; and within a space varying from fifteen minutes, to two, three, or four hours, the pulse gradually

failed, until it could no longer be distinguished at the wrists or temples, or even under the axilla.\* An almost imperceptible fluttering in the region of the heart, an attempt to retch, or a deep groan as the spasms attacked the vital parts, were then barely sufficient to prove, that life was not yet wholly extinguished.—The pulse, so long as it could be felt, was mostly very feeble and tremulous, regular, soft, and not very quick, usually ranging from 80 to 100. In a few instances, it rose to 140 or 150 shortly before death. Then it was distinct, small, feeble, and irregular; sometimes very rapid, then slow for one or two beats.

Along with the suspension of the general circulation, an almost entire cessation took place in the action of the secerning vessels. The saliva was dried up; the mouth became dry and parched; and the tongue deeply furred: white, yellow, red, or brown. It was not easy to determine how soon the kidneys ceased to perform

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\* Galen in his second Chapter on the Pulse, says, "In patients affected with Cholera the pulse is for the most part vermiculating; and at length scarcely distinguishable, like the creeping of ants." And afterwards "a vermiculating pulse is when the artery has the feel of the gentle rise of a wave, as if worms were crawling in it; but when it falls to the lowest degree of feebleness, and is withal exceedingly quick, it is said to be formicating."

their office; because what urine the patient made early in the disease, would be passed unobserved, during his frequent occasions to go to stool. But, there is reason to believe, that there was generally partial or complete ischuria: which, if the patient survived, frequently lasted several days: as was proved by his making no water, long after the purging had ceased. That there was sometimes spasm of the kidneys along with their state of complete inaction, was concluded from the severe pain experienced in the Iliac regions. The retention of the urine being in some cases preceded by pain and irritation at the neck of the bladder, and over the pubis, it was at first imagined, that it might be caused by a mere suppression; but no fluid came away upon the catheter being passed.

In this disease the head was less affected than any other part of the body. In some cases indeed, the early appearance of giddiness, swimming, blindness, pain over the eyes, redness of the conjunctiva, and contraction of the pupil, deafness and ringing in the ears, might have led to a supposition, that the brain was the primary seat of the disorder.—But these symptoms were by no means of general occurrence; and the conjecture founded upon them was contradicted by the almost uniformly unclouded state of the mind in the early parts of the attack.—In the midst of all the agony, which he

endured, the patient was calm, and perfectly collected. At no time of his life probably, was he more rational, and sensible to all that was going on around him.—In the latter stages of his illness, it is true, he sometimes began to wander, or sink into a hopeless stage of insensibility. But this is not to be wondered at; for then his sensorium was oppressed by an unusual congestion of blood in the brain; and his mental and bodily powers were wholly exhausted by previous great suffering, and diminution of the circulatory fluid.

It has been stated, that where the disease attacked in extreme violence, or seized persons of weakly habits, the energies of the system seemed to be at once exhausted; and death occurred without any attempts at reaction. Where, however, the strength of the patient's constitution, or the efficacy of the curative means administered, although inadequate wholly to subdue the disorder, were yet sufficient to resist the violence of its onset; nature made various efforts to rally; and held out strong, but fallacious promises, of returning health.—In such cases, the heat was sometimes wholly, at other times partially restored: the forehead, chest, and abdomen in the latter case becoming warm; whilst the limbs kept deadly cold. The pulse would return, grow moderate and even full; the cramps and vomiting disappear; the nausea diminish; and the stools become pitchy and fœculent.—And

yet, with all these favorable appearances, the patient would suddenly relapse ; chills, hiccough, want of sleep, great anxiety and delirium would arise ; the vomiting, oppression, and insensibility return ; and in a few hours terminate in death. In these cases the eyes were not uncommonly fixed in their sockets some time before death. The patient stared vacantly ; and could not be roused from the lethargy into which he had fallen. Sometimes, again, the symptoms immediately preceding the closing of the scene, were somewhat different. The anxiety and restlessness were heightened ; muttering delirium came on ; the breathing grew short, hurried, and ster torous ; and the sufferer sunk in the midst of the greatest mental and bodily anguish—Or he would suddenly expire as he turned in bed ; when the previous abatement of all bad symptoms, and restoration of the circulation held out the fairest hopes of recovery. Nor was it very uncommon to see a patient in this state at once seized with universal cramp, which extinguished life in a moment. Hence, many were found dead in their beds ; when no previous intimation, by groan or other sign of distress, had been given to those lying along side, of their approaching fate.

When the disease ran its full course, the symptoms were variously modified, according to variety in the type of the Epidemick or constitution of the individual affected. It will not be supposed, that all the appearances above des-

cribed were present at all times, and in every case. In the several periods of its revolutions, and in the infinite variety of individuals attacked, the disorder was of very different degrees of violence ; from simple vomiting and purging, with little or no cramp ; to universal spasm, incessant retching, and total depression of the vital powers.

Among Natives generally, where the attack was exceedingly severe, the constitution sunk with scarce an attempt to rally ; and of those who recovered, the secondary stage was of short duration, and unaccompanied with much reaction. In the milder cases, the attack either was repelled by the unaided powers of life itself, or readily gave way to the simplest means of cure. The pathognomonic symptoms of the disease speedily abated ; the patient sunk into a profound and quiet sleep ; and the breaking out of a warm equable perspiration all over the body, evinced the restoration of the vital powers, and might be considered an almost infallible sign of recovery. In such cases, slight debility, and irregular action of the intestinal canal, were the only ill consequences of the attack ; and a copious discharge of bile, or fœculent matter, either natural or procured by the exhibition of a single dose of a simple purgative, completed the cure.

But, in the more violent forms of the disease, recovery was longer protracted ; and the sufferings of the patient were more severe.—After the most

distressing symptoms had been in great measure subdued, he was still harassed by constant thirst, irritability of stomach, pain and soreness of the Epigastric region, watchfulness, and confused dreams. The stomach and bowels did not for a long time regain their usual tone; and the frequent occurrence of obstinate dysentery or diarrhoea proved, that almost irreparable mischief had been done to the whole of the chylopoetic viscera. In these cases the debility was great, and of long duration; and the strictest attention was required during many days, to prevent the patient from sinking entirely.—Sometimes, the debility terminated in incurable dropsy.—In some instances, partial loss of vision; in others, of hearing, ensued. In one man paralysis of the bladder and lower extremities, occurred early, and continued long after the cessation of the common symptoms of the disease.

It was almost uniformly observed, that health was soonest restored in those cases in which foeculent, black, and acrid motions were early procured; and that on the other hand, their absence was almost uniformly marked by feverishness, sour eructations, flatulence, constipation, and other signs of want of tone and sluggish action of the hepatic system.—Fevers of the remittent, and intermittent type were among the most frequent sequelæ of the disorder; but among natives, and especially those of weakly frame, they could not be considered to form an

essential part of the attack. They were hardly ever immediately superinduced upon the collapsed stage, and seemed rather an incidental affection; in bodies much predisposed to take on new forms of disease by great existing debility.

When the disease ran its full course with Europeans, and with Natives of robust athletic make, the following appearances generally presented themselves. What may be termed the cold stage or state of collapse, usually lasted from twenty-four to forty-eight hours; and was seldom of more than three complete days duration. Throughout the first twenty-four hours, nearly all the symptoms of deadly oppression; the cold skin, and oozing of clammy sweat from every pore, the feeble pulse, occasional vomiting, purging, and cramps; the thirst and anguish, continued undiminished. Then the system shewed symptoms of revival; the vital powers began to rally; the circulation and heat to be restored; and the spasms, sickness and desire to go to stool, to be considerably lessened. The warmth gradually returned; the pulse rose in strength, and fullness; and then became sharp, and sometimes hard. The tongue got more deeply furred; the thirst continued with less nausea. The stools were no longer like gruel or rice water; they, usually between the third and sixth day, became first brown and watery; then dark green, black, and pitchy; and the bowels during many days continued to

discharge immense loads of vitiated bile ; until with returning health, the secretions of the liver and other viscera gradually put on a natural appearance. These discharges were generally hot, acrid, and passed with griping and tenesmus. Sometimes they were of a bright yellow colour ; and the surcharge of bile was so great, as to be ejected in a pure stream from the stomach. It was remarked that, where the motions consisted of a chocolate coloured fluid, with floculi swimming in it, the patient rarely recovered.

The fever, which almost invariably attended this second stage of the disease, may be considered to have been rather the result of an effort in nature to recover herself from the rude shock, which she had sustained, than as forming any integrant and necessary part of the disorder itself. It partook much of the nature of the common bilious attacks of these latitudes. There was the hot dry skin ; the foul, deeply furred, dry tongue ; parched mouth ; thirst ; sick stomach ; depraved secretions ; restlessness ; watchfulness ; and quick variable pulse ; sometimes with delirium, stupor, and other marked affections of the brain.

Generally, when the disorder proved fatal, after reaching this stage, the tongue, from being cream coloured, got brown, and sometimes black, hard, and more deeply furred ; the teeth

and lips were covered with sordes ; the state of the skin varied, chills alternating with heats ; the pulse became extremely quick, weak, and tremulous ; hiccough, catching of the breath, great restlessness, and deep moaning succeeded ; and the patient soon sunk, incoherent and insensible, under the debilitating effects of low nervous fever, and frequent dark, tarry, alvine discharges.

In other cases, this secondary period ran a somewhat different course. As the action of the heart and arteries was renewed, and the natural warmth of the body returned, an unusual degree of energy succeeded. The brain was evidently affected ; and the patient was quite insensible to the great danger into which he had fallen. The pulse rose as high as 120 ; great heat, especially over the large cavities, was complained of.—There was extreme agitation and distressing thirst. The patient continually called for cold water, to relieve the burning sensation of the abdomen. Sometimes, a warm perspiration broke out near the wrists and forehead, which afforded temporary relief to his sufferings.—To this state of excitement, that of collapse quickly succeeded. There was then great prostration of strength ; the bowels became quite torpid ; severe pains occurred low down in the abdomen, near the scite of the rectum, which were always aggravated upon stools being procured by medicine. The state

of the stomach now excited surprise ; its unnatural irritability was entirely gone, and the most nauseating medicine could be poured into it without exciting vomiting.—It rarely occurred, that the patient survived the great sinking produced by this stage ; and even where good fortune and the strength of his constitution carried him through it, he suffered long after from debility and disordered bowels.

The attacks of this disease sometimes came on at once, without previous warning ; sometimes various signs betokened their approach : according to the existing state of the Epidemic, and of the individual affected.—In large cities and in camps, where the disease existed in full force, and the virus was peculiarly concentrated, persons in previous perfect health were frequently seized in a moment, without any apparent cause.—Where again, the disorder prevailed in no very malignant form, healthy individuals were sometimes at once brought under its influence, from marked errors in diet, or sudden exposure to other powerful exciting causes.—Where, however, neither of these circumstances obtained, the attack was usually preceded by various symptoms of derangement of the alimentary canal ; anorexia, nausea, sickness of stomach, and costiveness. To these, a looseness would perhaps succeed, which kept on for a day or two, till the patient was at once seized with vomiting and the other

pathognomonic signs of the disease, upon drinking a draught of cold water, or incautiously going from hot into cold air.—In many cases general lassitude and shivering preceded the attack.—In some persons, who, under the alarm produced by these ailments had recourse to purgatives, immense quantities of black biliary matter were passed off; shewing perhaps, previous deranged state of the hepatic functions.

The general appearances of the disease being thus described, it will be right, before proceeding further, to speak shortly of the varieties assumed by it, in its different points of attack. This digression will not, however, occupy much time; for throughout its long and destructive track, and among the myriads whom it affected during its progress, the Epidemick exhibited perhaps less variety, and fewer discrepancies, than any general distemper to which the human body is subject.

To begin with Bengal. During the two years in which it more or less harassed Calcutta, it appeared in every degree of mildness and severity, amongst the various castes and classes of persons affected, in different periods and seasons.—The only general remark that can, therefore, be made here, is that spasms, and subsequent reaction were more remarkable among the Europeans; immediate collapse and prostration of strength among the Natives.—It was more generally fatal perhaps in February 1818, than

in the preceding autumn; and yielded less readily to medicine.

At Jessore, Backergunge, and Momensing, it has subsisted during an equal length of time, sometimes in greater, sometimes in less vigour; but decidedly with greater and more general fatality, in the earlier months than now. In these districts and in the vicinity of Bullooah, near the mouth of the Ganges, at first hardly any of those attacked recovered without medicine.

In Dacca, where it has been from July 1817, to the present moment, without any period of entire intermission, there seems to have been nothing particular in the form generally assumed by it.

In Sylhet it was far more destructive in the latter part of 1818, than it had been during the former year; proving fatal in a much shorter space of time, and resisting the powers of remedies, which formerly effected a cure. If nothing curative was attempted for an hour, the case was then considered hopeless.

From November, 1817, to November, 1818, in Tipperah the Epidemick exhibited considerable variety; sometimes it was attended with no vomiting; sometimes there was no pain in the bowels, nor general spasmodic affection.—There was always great prostration of strength. The

disease was milder towards the end, than in the commencement. In the other districts of Bengal there was nothing unusual in the appearances of the disease. .

At Chuprah, at first, the violence of the spasms chiefly attracted attention, latterly its type was modified. The distinctive marks of purging and vomiting still obtained; but the spasms were not so severe or constant; and the attack was not so sudden: being generally preceded by a sense of indisposition, and pains about the abdomen and neck of the bladder. In both periods the egesta during the attack were similar; but in the latter the voiding of worms was a common occurrence; and in cases, in which stools were procured by medicine, scybala generally came away.

At Dinapore, whilst the Epidemick destroyed numbers in its usual mode, it not unfrequently appeared in a different and equally fatal form; in which vomiting and purging were wholly absent, and the body was universally affected by spasm. This form occurred equally among Europeans and Natives.

In Tirhoot, spasm scarcely ever appeared; and the pressing symptoms were general depression, and discharges from the bowels.—At Mullhye again, and other places on the Eastern frontier, cramp of the extremities was of common occurrence.

Between Patna and Benares the symptoms to be chiefly combated were the immediate depression of the vital powers, the languid circulation, and coldness of the surface.—At Benares, in the Hot Weather of 1818, the Epidemick appeared in its usual shape ; but in the ensuing Rains many persons died with the following symptoms. The individuals complained, generally after eating, of great pain of stomach, faintness, and a sense of sinking, as if life were quitting them ; and unless relieved by some stimulant, soon expired.—A great scarcity of grain then existed in the city ; and the sufferers were generally of the poorer class, and debilitated by the want of nourishing food.

At Cawnpore, and in the Doab and the districts East of the Ganges, the disorder kept its usual course ; and was generally followed by debility and slight bowel complaints.

In the Centre Division of the Army, Europeans were generally affected in the following manner. They first complained of severe pain in the abdomen, particularly about the umbilicus. Then violent vomiting and purging of a fluid like rice water came on, and was followed by severe spasms in the extremities and muscles of the belly.—In some instances, the patients were suddenly attacked with cramps, without any discharge from the alimentary canal.—The countenance was ghastly in the extreme, in the commencement of

the attack.—Then succeeded the usual appearances of cold, clammy, blue skin; sunken eyes; shrivelled fingers; want of pulse; dry parched mouth, and thirst.—In some the pulse remained; and was then quick, and of a wiry feel.—In almost all, there was complete ischuria, and in those who survived, no water was passed during many days.—The contractions of the muscles in the limbs were remarkably painful and distressing. Where curative means were not applied, or failed in giving relief, the patient usually perished within twenty-four hours. A curious symptom was sometimes observed immediately previous to dissolution. When fluid was administered to the sufferer, he collected it in the corner of his mouth, and then squirted it out with great violence; and this at a time, when he was so exhausted as to be incapable of the slightest general exertion. The early symptoms among Natives were similar in kind, but less in degree. The spasms were feebler; and the debility more striking. In many the exhaustion was so great, that they could not articulate. The abdominal muscles frequently remained relaxed and flaccid. In others they were, together with the viscera, and muscles of the upper and lower extremities, thrown into violent spasmodic action.—The fingers and toes were blue and contracted, and their last phalanges curved inwards. The pulse in many could not be felt in the carotids.—The buccinator muscles fell in; and the whole face was hollow and haggard.—The

fluid ejected upwards was usually colourless ; that downwards watery and muddy ; sometimes bilious.—Towards the last stage, a thick film came over the ball of the eye ; the tunica conjunctiva was suffused with red blood ; the countenance assumed a sharp hippocratic appearance, and some hours before death was so depressed and altered, as not to be readily recognised.—The corpses of such as died, looked immediately after the breath was gone, like bodies that had been long dead ; so wan and shrunken were they. It was not however remarked, that putrefaction took place sooner than in such as die from ordinary ailments. As the powers of life were more readily destroyed in the weakly frames of the Natives, than in the European, with them death occurred proportionably earlier. Many accordingly died between the first and the twelfth hour of the attack.—It was singular, that neither with Europeans nor Natives were those symptoms of strong reaction, and subsequent fever, which, among the former at least, were of almost constant occurrence in the lower parts of India, observed.—Debility ; disordered tone of the stomach and liver ; dysentery, and diarrhoea, formed the usual sequelæ. In many recovery was remarkably rapid ; and even in the severest cases, the constitution did not appear to have suffered any permanent injury, and the patient generally regained his former health and strength in one, two, or at the farthest three months.

- In the Left Division of the Army, spasms and excruciating burning in the stomach were very generally present, with the other diagnostic signs of the disease.—Suffusion of bile, fever, chronic diarrhoea, and debility, were its ordinary consequences.

In the Nagpore Division, the symptoms were extremely violent, and frequently carried off the patient in four or five hours.—The depression was always exceedingly great ; with dim glistening eyes ; headache over the eyebrows ; gnawing tightness of the stomach, burning and thirst. The spasms of the trunk and limbs were not uniformly present ; sometimes they were slight, sometimes severe.—The vomiting and purging occurred together or alternately ; and in every degree of violence.—The pulse was sometimes full and steady ; at other times weak and intermitting ; and occasionally even a total cessation of arterial action took place. Strangury was not uncommon. The skin, though generally cold and moist, was sometimes dry and hot.—The only general after effect of the attack, was extreme debility.

Among the troops of the Rajpootana Force, the disorder was more violent in the middle, than in the early or latter part of its visit.—In Europeans, and at first in Natives, the severity of the spasmotic affections of the extremities was chiefly remarkable ; the balance of the circulation was not greatly disturbed, and the pulse did not

rapidly fail.—Towards the middle period of its stay, the cramps were hardly to be observed among the Natives. The morbid agency was then so powerful as immediately to arrest the circulation, and produce entire exhaustion.—The total want of pulse, coldness of body and extremities, prostration of strength, and wrinkling of the skin of the hands and feet, were then the principal marks of a state, from which it was hardly possible to rouse the patient, even when the vomiting and purging were allayed.—Latterly, the presence of the disorder was barely discernible in the slight evacuations and feeble twitches accompanying its attacks. Fever was a rare consequence of the disease. Extreme weakness ; irritable stomach ; irregular action of the bowels ; and in a very few cases dysentery, formed its usual sequæ.

In Jeypore the attack was always preceded by general lassitude, frequently ending in shivering like that of an ague fit.—Then succeeded severe pain of belly, followed by vomiting and purging, cramps, and the usual train of symptoms. A looseness, lasting four or five days, sometimes came after the attack ; but generally the sufferers recovered surprisingly fast : in some instances in a few hours.

In the Hansi Division, the symptoms coincided with those enumerated in the general description. Vomiting was more violent in some ; purging in others.—Excessive restlessness, burning heat in

the bowels, and spasm in the extremities, were present in almost every case.—Of those who recovered, many had to undergo fevers of the remittent or intermittent type, before they regained their health.—Bowel complaints were very rare; greater or less debility was present in all.

At Delhi, Meerut, Coel, Agra, and Futtigur, as the disease was generally milder, than in other parts of the country, it ordinarily left no other ill effects than weakness, and disordered bowels.

Having thus described the symptoms of this tremendous disorder, let us now see what were the effects produced by it in disorganising the human body, and deranging its most important functions.

## SECTION III.

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### APPEARANCES AFTER DEATH.

Of those who died in Calcutta, it was believed, perhaps rather fancifully, that the bodies sooner underwent putrefaction than the remains of persons dying under the ordinary circumstances of mortality.—In many, a striking proof of the unnatural accumulation of blood in the great cavities, was afforded by the thorax and abdomen continuing preternaturally warm for many hours, when the limbs were cold, livid, and stiff.

The bodies of such as had sunk in the earlier stages of the malady, frequently exhibited hardly any unhealthy appearance. This was more especially observable among Europeans of weak, ~~and~~ sickly constitutions, and among Natives of the poorer classes.—On laying open the bodies of such persons, it was remarked, that the abdomen emitted a peculiar offensive odour, very different from the ordinary smell of dead sub-

jects.\* In them there was not the slightest mark of previous increased vascular action throughout the whole intestinal canal; which rather appeared paler than usual, and flabby; and was filled with an amazing quantity of whitish or muddy fluid; or empty and inflated with air.—Sometimes in the stomach this fluid was found mixed with pieces of curdled matter, or lumps of indigested food. This appearance of relaxation was not confined to those in whom the spasmodic affections were absent. It occurred frequently where the cramps of the abdominal muscles had been violent; and the pain in the stomach excruciatingly severe.

On laying open the abdomen of such as had lived some time after the commencement of the attack, and especially of Europeans and the stouter Natives, a different set of appearance was brought into view.—The omentum and mass of intestines were often found displaced, and preternaturally vascular: with partial adherence between the diaphragm, liver and surrounding viscera.—The colour of the intestines varied from deep rose, to a dark hue; according as the increased vascular action had been arterial or venous.—In

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\* In one case, that of a Gentleman who died after six hours illness, the three Medicalmen who opened the body were sensible of this peculiarity; and all were for a day or two affected with vomiting, looseness and other symptoms of disordered bowels. In this case there was no appearance of disease in the alimentary canal.

some instances the outer surface of the stomach likewise, was florid, and its veins turgid with dark blood; but this was not so in the generality of cases.

This organ was, however, much contracted, and its substance hard and frequently thickened.—On cutting into it, it was found sometimes empty, sometimes partially, and at others largely filled with fluid of various colour and consistence; thin and transparent, milky, green, dark, grumous, or muddy. Sometimes, this fluid was black, like lamp black; sometimes it consisted of pure blood; and at other times of blood mixed with bile.—On removing this the inner surface was frequently seen lined with coagulable lymph, bloody gelatine, or a muddy, glary, viscid matter; which on being washed away, brought the highly inflamed coats into view. Of these the appearance was various; generally they were crossed by streaks of a deep red, interspersed with spots of inflammation made up of tissues of enlarged vessels.—Sometimes the inflammation was florid and bright coloured; so as to give the whole inner surface of the organ the appearance of a minutely injected anatomical preparation.—In some instances, ulceration had begun, and the villous coat was partially abraded; in others incipient mortification had occurred, and the coats were puckered into net work, or drawn into folds, with patches of red near the pylorus.

The intestines were sometimes largely inflated with air; at other times flattened, thickened, and corrugated; and sometimes partially contracted.—From violent action and reversed peristaltic motion previously to death, intus-susceptio of the large and small guts was of no unfrequent occurrence.—In some instances this happened in two or three places; and the portion of detained intestine was nearly a foot in length. On cutting into the intestines, the smaller guts were observed to be more inflamed than the larger.—The duodenum, and more particularly its upper portion, was generally similar in morbid appearance to the stomach; corrugated, inflamed, with florid or deep red patches and streaks.—In cases of several days standing, the inner coat of the small guts was ulcerated, and they were filled with sanguineous, having portions of lymph floating in it.—Then the large intestines were lined with a dark, thick, pitchy stuff poured out from the liver, as it had begun to renew its action.—In such as died early, the fluid was limpid, or muddy, with cheesy matter at times floating in it.—In general neither bile nor faeces were seen in the intestinal canal.—The colon and rectum were frequently contracted and inflamed, in their whole extent.—The former, more particularly near its sigmoid flexure, was sometimes not of the thickness of a finger.—The inner surface of the rectum near its termination in the anus was in some instances abraded; in almost all highly vascular.

The appearance of the liver was very various.—In most cases, and in nearly all young plethoric subjects, it was enlarged and gorged with blood; which flowed profusely and sometimes spouted up, on a scalpel being plunged into any part of it.—In a few, it was large, soft, pappy, light coloured with greyish spots, and not much distended.—In others again, it was collapsed and flaccid.—In some rare cases suppuration was discovered to have taken place; and a pint and a half of good pus was found in one, who had been ill only twelve hours, and who had not before complained. These appearances were probably accidental.

The gall bladder was generally full of dark green or black bile; sometimes it was empty, or loose, with a quantity of thin, pale, or light coloured fluid.—In many the liver and gall bladder had no mark of diseased action.—The Hepatic Duct was usually enlarged and relaxed; the Ductus Communis generally contracted, and in several instances obstructed by gall stones.

The spleen was of softer texture than usual; uniformly enlarged and distended with blood.—The kidneys presented no unusual appearance. The urinary bladder sometimes partook of the general inflammation; but it was usually quite empty and shrunk, so as to be raised with difficulty from the inner surface of the pubis.

The great venous trunks in the abdomen, and particularly the mesenteries, and vessels of the portal circle were uniformly enlarged and distended.—The vena cava was sometimes thick and hard like a sausage.—The lacteals were turgid with chyle; so as frequently to have a tortuous knotty appearance.—In the thorax the same marks of great internal accumulation were present.—The heart and great blood vessels were stuffed with clotted blood; and the lungs were black, collapsed and preternaturally heavy. The inner surface of the oesophagus was sometimes inflamed and ulcerated.—In other respects the thoracic viscera were sound.

The brain was generally of natural appearance; especially in those who died early.—In some cases there were various marks of venous congestion and incipient inflammation.—The Sinuses, and vessels leading to them were turgid with dark blood. Partial adhesions, and deposition of lymph, were observed to have taken place between the dura and pia mater, near the coronal suture, and towards the occiput.—Serous effusion likewise occurred in a greater or less degree between the membranes, or in the ventricles.—In one or two rare instances the Sinuses had given way from over distension, and a great quantity of blood was found poured out on the surface of the brain.—In cases of persons affected with stupor previously to death, a quantity of fluid escaped immediately upon punc-

turing the dura mater; and much serous effusion had taken place throughout the cavity of the brain, with partial thickening and inflammation of the meninges.

This description may be closed with a short recapitulation of the morbid appearances, as they were modified in situations in which there was a large field for observation.—In the Centre Division of the Army among Europeans they were very contradictory.—In many, particularly of such as died early, the stomach and intestinal canal were found full of muddy fluid, without the slightest mark of inflammation.—In others the vessels of their inner coats were turgid, sometimes highly inflamed, ulcerated and gangrened.—The stomach was frequently thickened and contracted; and the small intestines full of hard knots from one portion being forced into another.—The liver was congested, inflamed, and darker than usual.—The gall bladder overloaded with dark bile; the ducts distended and relaxed.—The thoracic and cerebral viscera sound. Among Natives the alimentary canal in its entire column was uniformly seen full of a muddy fluid; and its inner surface lined with a clayey substance of the same nature.—The quantity of this earthy looking stuff was sometimes so large as in a manner to plaster the villous coat; and to leave a thick sediment on passing through the sheet in which the corpse was wrapped.—Slight traces of

inflammation were occasionally observed; but in most instances, no mark of increased vascular action was perceptible.—The liver was sound; and the gall bladder filled with viscid pitchy bile.—Neither in Europeans, nor in Natives, was any tinge of that secretion discovered in the intestinal canal.—In the Jubbulpore Force the stomach and intestines were found filled with a limpid fluid; and in some partially inflamed.—The liver exhibited various appearances; in some it was turgid, and easily lacerable; in others flabby and collapsed.—The gall bladder was in some distended with blackish, in others with dark yellow, inspissated bile; and in others nearly empty.—The contents of the head and chest do not appear to have been examined.—In the Nagpore Force the interference of relatives generally prevented the inspection of the bodies of the dead.—In the Rajpootana Division the morbid appearances were nearly as described in the Jubbulpore Force.—In the Kurnaul Division, the abdominal viscera generally appeared as if gorged with blood: the stomach was filled, and sometimes distended by muddy water.—In Europeans some marks of inflammation were observable; but in Natives the surfaces of the stomach and intestines were perfectly pale.—The liver and gall bladder were healthy; with bile of natural colour and consistence in the latter.—The spleen was of softer texture than usual.

## SECTION IV.

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### PROXIMATE CAUSE OF THE DISEASE.

THE present report being intended to serve, rather as an useful repository of well ascertained facts, and practical deductions, than as a vehicle for theoretical reasonings, and hypothetical discussions ; it will not be expected, that such features of the disease, as cannot be at all clearly developed, or only with very great difficulty, will here be dwelt upon at length.—Those points in the history and essence of the Epidemick, which have reference to its remote and proximate causes, would seem to be of this description ; and may, therefore, be soon dismissed, as nearly incomprehensible and incapable of solution. But, as the mode of treatment, which we may chuse to follow, in combating the disease, will in some measure depend upon the notion we may form regarding its proximate cause, it will be well to ascertain, as far as possible, in what that consists.—Nothing more, however, than a distant approximation to the truth can be here looked for.

It may then be conjectured, that the stomach and small intestines are the primary seat of the morbid action in this disease.—That this is the case, might have been supposed from the analogy of its symptoms with those caused by violent lesions of these parts from the introduction of mineral and other poisons, and is proved by the whole history of the attack.—The stomach, almost without exception, is the organ first affected.—The patient complains of soreness, constriction, and pain in the Epigastrium ; his belly swells ; he becomes sick ; faint ; and then he vomits and purges.—All this is prior in time to the sinking of the pulse, and coldness of the extreme parts ; and in most cases, to the spasmodick affections.—Then, the stomach, throughout the whole course of the illness, continues to demand attention, as the part chiefly disordered. To it the sufferer invariably refers the intolerable pain, anguish, and burning heat, by which he is tormented.—Again, the irritability of this organ and consequent vomiting, are by far the most obstinate parts of the disease ; and generally keep up long after the spasms and other symptoms have been entirely subdued.—Moreover, the great share, which the stomach and small intestines have in the disordered action, is shewn by the manner in which the fluid is ejected, and by the appearances observed after death.—For it was frequently remarked, that, the contents of the stomach were thrown out with violence, at a

time when the abdominal muscles were in a relaxed state ; and when, therefore, the spasmodic contraction was clearly referable to the organ itself.—And after death its coats were found turgid, inflamed, and even ulcerated, and partially mortified : evidently from the high degree of excitement, and inordinate action into which it had been thrown during life,

That the small intestines shared more largely in this action than the great guts, was proved by the greater vascularity of their coats ; the frequent intussusception caused by reversed peristaltick motion ; the greater inflammation of their inner surface ; and their generally containing more of the muddy fluid, which characterised the disease.

That the depressed state of the circulatory power, and diminished action of the heart and arteries, were rather a consequence and symptom of the severe shock, which the system had received in one of its principal organs, than a primary affection, was rendered probable, by their being subsequent in appearance to the vomiting and purging ; by their gradually increasing with the increasing aggravation of those symptoms ; and by their total absence, in some cases for several hours after the other signs of the disease had reached their height.—This too, was proved by no trace of inflammation or other

diseased appearance being discoverable in the heart or lungs ; excepting the distension of the large trunks, which was probably merely an effect of the disturbed state of the circulation, and consequent accumulation of blood in the centre.—Besides, supposing the suspended state of the circulation to have constituted the essence of the disease, it will be found, that the cause assigned is wholly insufficient to account for the effects derived from it.—In syncope and other affections of the vital functions, the action of the heart and arteries is often either wholly, or partially suspended ; and yet no such consequences as those distinguishing this disease are observed to follow.

Nor, can the disorder be with greater reason ascribed to spasm of the extreme vessels ; for in the cold fit of agues, and other diseases of a like description, there is the same want of arterial action, and retirement of the blood from the surface, without the burning heat and great internal tumult of this disorder. The state of the skin and other symptoms would seem to shew, that the capillary vessels are in this disease rather in a state of atony or mere inaction, than of spasm.—For here there is none of that horripilation, dry skin, and shivering, which in the cold stage of intermittents are supposed to arise from, and to mark the presence of spasm.—The skin on the contrary is shrunk, clammy, and bedewed with

perspiration, as if the mouths of all the excretaries were thrown wide open.—In like manner, the suspended state of the secretions seemed to depend mainly on inaction; since the suppression or retention of urine, a most remarkable and almost constant symptom of the disorder, was not attended by those fixed pains in the kidneys and ureters, which so invariably accompany the attack of nephritick complaints.

It appears doubtful whether derangement in the hepatick system had any share in the production of cholera, either immediately, or in sympathetick connection with the skin.—The dissections shew, that the appearance of the liver was very various; and from this, we may conclude, that the general turgidity of that viscus, as well as of the spleen, was merely owing to that general retrogression of the blood, which filled the large cavities, and swelled all the great trunks. But it will be said, that the stuffing of the gall bladder with thick green bile, evinced the previous disordered condition of this organ.—To this objection it may be replied, that the appearance was not by any means universal; for the cyst was often empty, or partially filled with pale, or light yellow, thin, fluid; besides that even when present, it might be accounted for in several ways, without our being obliged to suppose, that it indicated the agency of the liver in the production of the attack.—For, it is

well known to every practitioner in India, that the secretion of darkropy bile is a sure attendant on that gorged state of the organ, which we here imagine to be caused by an over accumulation of blood in the trunk ; and is invariably increased by the use of calomel ; a medicine largely administered in almost every case of cholera.

But, the accumulation may be explained without having recourse to any theory of increased or disordered secretion in the liver.—It is only necessary to suppose, that the natural quantity of fluid was denied its usual passage into the intestines ; and that this must have been the case, will be admitted by every one who reflects on the violent peristaltic motion and contraction of the duodenum always present in the disease, and the effect which they must necessarily have produced in compressing and shutting the mouth of the ductus choledochus. Hence regurgitation, and stagnation, and consequent thickening of the bile in the gall bladder. To all this may be added, that no one ever heard of affections of the liver giving rise to such a train of symptoms as characterize cholera, although that viscus is in these latitudes daily seen in every condition of morbid action, by all persons in extensive practice ; and that hundreds of individuals previously in perfect health were seized instantaneously with the disease, in all

situations in which the virus was much concentrated.

There is no reason to presume, that the brain was in this disorder otherwise affected than secondarily, from previous derangement of the *principia* and disturbance of the circulation. For generally to the very last, the intellectual powers continued wonderfully clear, amidst all the other suffering ; which would not have been the case, if the disease had held its seat in the sensorium ; or had originated in any sudden depression, or other disturbance of the nervous energy.—The head was rarely attacked in the commencement of the disorder ; the headach, suffused eyes, delirium and lethargy, and other signs of congestion, all ordinarily came on late ; and might justly be referred to the filling of the cerebral circle, when the heart drooped, and there was no longer free play in the lungs ; and to the exhaustion of the vital powers under great and unusual suffering. This conjecture was confirmed by the state of the contents of the skull after death.—The brain and its membranes, in those who were early cut off, were generally found in a healthy condition ; or merely with some degree of congestion ; whilst the great distension of all the vessels, the deposition of lymph, and watery effusion were ordinarily observed in those only, who died in the latter stage of the complaint.

Upon the supposition, that the stomach is the main seat of this disease, it will not be difficult to account for the spasmodick affections so generally accompanying its progress; for similar symptoms are commonly present in violent lesions of this organ, produced by other causes. Thus, cramps in the bowels, and lumpy contractions of the abdominal muscles, are frequently observed in enteritis and gastritis; and trismus and spasms of the extremities often form part of the train of symptoms induced by the introduction into the stomach of arsenic, sublimate, and nitric acid, or of large potations of bad spirituous liquors. Besides, it is an old axiom in physic, that "atony begets spasm;" and in virtue of it we may allow, that here the contractions at first produced by irritation, are afterwards kept up by habit, and by the universal debility so speedily produced in this disorder.

The preceding remarks would seem then to warrant a conjecture, that the stomach and small guts, are the primary seat of lesion in Cholera. It remains to enquire of what nature this lesion is. By some it has been assumed to consist in a violent affection of the nerves distributed on their inner surface, superinducing great general disturbance of the nervous influence, and universal depression of the system. But, if this were the case, the symptoms in Cholera should be similar to those of other disorders.

manifestly affecting the brain and sensorium by sympathy with the nerves of the stomach.—And yet how different are they from the drowsiness, loss of memory and of voice, stupor, and universal convulsions, which always speedily follow the application of narcotick substances to the inner coats of the stomach.—The appearances in Cholera have much greater resemblance to those of gastritis, ileus, and other inflammatory and spasmodic affections of the alimentary canal. Thus in gastritis, there is the same burning pain in the region of the stomach, with soreness, distension, severe vomiting, and occasional purging, thirst, anxiety, restlessness, tossing of the body, great debility, watching, and quick contracted pulse; and in the more violent degrees of the disease, faintings, interrupted respiration, cold clammy sweats, hiccup, coldness of the extremities and intermitting pulse.

But, then it must be admitted, that the appearances after death render it doubtful how far the primary affection in Cholera can partake of inflammation.—For, it has been seen, above, that in the bodies of those who sunk at a very early stage of the attack, there were ordinarily none of those marks, which are supposed to characterise, and to be necessary to prove, the existence of previous inflammation: the whole column of the alimentary canal being found paler than natural. And, in old and infirm per-

sons, in whom there was little or no plethora of the circulatory system, and comparatively less vascular congestion, scarcely any inflammatory appearances were observed, even when the sufferers survived many hours, and had the disease in its utmost violence.—From these facts there is reason to conclude, that the great vascularity of the inner coats of the canal, the thickening of their substance, and the introsusception, discovered in the bodies of robust subjects, and generally of those who died late in the disease, were, perhaps, merely the effects of the previous violent straining and antiperistaltic motion; and of the general congestion produced by venous accumulation in the trunk.

But, if the primary morbid affection of the alimentary canal were neither vascular nor nervous, it will be asked, in what did it consist? To this we can only reply, (which is in other words a confession of ignorance:) that like the pestilential virus, which produced it, it was of a peculiar and previously unknown nature; and evinced itself by symptoms of a novel and most alarming description.—Whether the enormous discharges of muddy and pale fluid, were the effect of a new species of secretion, or of a general relaxation and gaping of the vessels lining the viscera, or merely of the squeezing and emptying of the lacteals caused by violent retrograde action in their canals, cannot perhaps be deter-

mined.—The contents of the lacteals would, however, seem to have been quite inadequate to their supply; and the supposition of a new secretion is hardly consistent with the suspension of that action in all its established organs throughout the body.\*

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\* We must, after all, agree with Celsus "that the disease is so divided between the stomach and intestines, as to make it difficult to determine to which part it most belongs." B. 4. Chap 11.

## SECTION V.

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### OF THE REMOTE CAUSE OF THE EPI- DEMICK.

WE have now arrived at a branch of our enquiry, in which, each step as we advance, presents new obstacles to our progress ; and the mass of testimony and of fact, upon which alone we could hope to build a reasonable theory, is so various and irreconcilably contradictory, as after the maturest deliberation, to leave us in the midst of doubt and perplexity. Since the study of Medical Science first began, physicians have in vain attempted rationally to account for the origin of those general pestilences, which have from time to time desolated the different quarters of the globe. Taught, however, by the constant defeat of their speculations, they would appear to have become at length convinced of the futility of all such enquiries ; and of late years to have abandoned the subject, as one of those over which nature has thrown an impenetrable veil. It is not with the hope of proving more successful than others, or of discovering the secret causes that generated the scourge of which we are now treating, that we venture to hazard an opinion upon a matter, which must be admitted

to be entirely beyond the range of our understanding. All that is meant to be here attempted, is to shew the insufficiency of every hypothesis yet advanced, to account for the phenomena of the disease ; to prove rather in what its generation and dissemination did not consist, than in what they truly did ; and to explain some of the peculiar laws observed by it during its progress throughout the country.

From its being observed, that in the higher latitudes, a very warm atmosphere was essential to the production of sporadic cholera, and that on the coasts of Ceylon, and in other parts of India, in which the disease has from time to time prevailed endemically, its attacks were manifestly brought on by great and quick fluctuations in the temperature of the air ; it has been supposed, that nothing more was wanting to account for its rise in these tracts as an epidemick, than the general existence of similar vicissitudes. Accordingly, it has been held by many intelligent individuals in this country, that the recent Epidemick was solely caused by the extremely variable state of the weather, which obtained previously to and at the time of its commencement.—But, this supposition arises entirely from confounding the Remote with the Exciting Causes of the disease.

It is no doubt very true, that sudden changes of temperature frequently immediately produced

the disorder in situations in which it had not been known previously to exist; and reproduced it where, having previously existed, it had for some time lain dormant. But, that all this was merely accessory, and that something else was necessary to the generation and continuance of the Epidemick is sufficiently clear from the following, amongst many other considerations.

If changes in heat and moisture were alone requisite to the production of the disorder, then it ought always to appear, when such changes are in operation. And yet, that this is not the case, is proved by the whole history of this country. For such vicissitudes are inseparable from its climate; and form an essential part of the revolutions of its seasons. Nevertheless, till the year 1817, the disease had never been known as an Epidemick in any considerable part of its very extended limits.—Again, during the numerous campaigns, which have been undertaken since the first establishment of the British Empire in India, our soldiers, both European and Native, have been exposed times without number, to every possible variety of weather, during all seasons of the year, and at all hours of the day and night, without being subjected to the pestilence that nearly depopulated the camp of the Marquess of Hastings.—To choose only a few instances of recent occurrence. In the first year of Lord Lake's campaigns, the troops took the field as

early as September; and frequently marched during the whole day, when the heat was excessive, and the temperature of the direct rays of the sun, probably, above 150. In Colonel Monson's retreat, again, the broken remains of the Division under his command were during many days of excessive rain, exposed to the weather, without food, shelter, or covering; and under every possible circumstance of mental and bodily distress. And yet in neither case had they the disease. In like manner, during the capture of Java in 1811, the soldiers were frequently exposed along the coasts to rain, heat, cold, change of food; crowded to excess, sleeping in the sun by day, and in the dew by night, whilst a chilly land wind blew from the mountains— Still cholera was not the consequence. During the long period of disturbance, which preceded the last rupture with Poona, and the overthrow of the Mahratta Powers, the Jaulna Force was for several years almost constantly employed in the field under canvas\*; and yet the disease was new to them when communicated in the summer of 1818, from the neighbouring city of Nagpore.<sup>t</sup>

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\* So with the Force that marched under Colonel Close upon the Nerbudda in 1810, the thermometrical vicissitudes frequently amounted to 50: and even 60: during twenty four hours; yet no Cholera followed.

<sup>t</sup> The instances quoted in the preface, of Colonels Pearse and Cokerell's detachments, are, as far as we

But, it may be said, that the long continued irregularities, and frequent unwholesome vicissitudes of the weather, which took place during the years immediately antecedent to the rise of the Epidemick, had debilitated the human constitution, and generally predisposed it to be morbidly affected by such exterior circumstances, as in former times passed over without materially injuring it. But, even this conjecture will not hold good.—For the Medical Returns shew, that several detachments and divisions of the Army underwent every species of exposure and fatigue during the period under review, without suffering from the disease ; and were yet virulently attacked, as soon as they came within the known sphere of its epidemical influence. This was strongly exemplified in the case of the Nagpore Subsidiary Force, which had not a case of the disease, whilst conducting the siege of Chanda ; during which the troops were exposed to the great heats of the day under a range of stony hills, and often, without shelter, to the dews of night ; and yet no sooner did they reach the confines of Nagpore, than it assailed them in the manner of the plague.—So with the Left Division of the Army.—The troops composing this Division had been almost constantly moving from the beginning of March ; and in the last know, the only exceptions to this rule ; and their occurrence is too remote to admit of our discovering all the causes operating to produce the disease amongst them.

ter part of that month, and the first week of April, had undergone great privations and fatigue, whilst conducting a heavy train of artillery, and a numerous convoy of carts, in the cold of the night and great heats of the day, through a mountainous and difficult country.—Yet, they felt nothing of the Epidemick, until they, on the 9th and 10th of April, reached Jubbulpore, in which town it had been raging several weeks; from which time they became numerously affected by it.

Nor were rain and moisture, any more than mere alternations of heat and cold, alone sufficient to originate the disease.—For, nearly all the corps moving on Hansi and Hissar to form Brigadier Arnold's Force, must have met with rain during their advance from various points in the Doab.—The 1st Battalion 29th Regiment Native Infantry was, we know, exposed to excessively wet weather during the whole of its march from Aligur.—Still, it continued entirely exempt, till, at Hansi, it joined those corps, which had got the Epidemick on passing through Delhi.

These facts would of themselves be sufficient to do away every hypothesis founded on the belief, that the rise of the Epidemick was solely derivable from variations in the sensible properties of the atmosphere; even were not the whole history of its progress such as to

discountenance that belief.—But has it not in Bengal again and again risen and fallen, and reappeared, during all periods of the year, and under every possible variety of season, heat, cold, dryness, and moisture?—In Upper India again, did it not in Benares, Bundekund, Oude, and the Southern Districts of the Doab, rage virulently during the dry months of the Hot Weather; whilst it appeared not in Delhi, nor in Meerut, nor in Jeypore, and the tracts in their vicinity, until the Rains had set in, and the air was loaded with moisture? So, of the five camps visited by it, the Centre Division was attacked in the Cold Season; the Nagpore and Saugor Division, in the height of the Hot Winds; and the Rajpootana and Kurnaul Divisions whilst it poured down rain.

The hypothesis of the disease owing its origin to the use of particular sorts of food, or to the consumption of blighted, and poisonous grain, may be dismissed in a very few words, as wholly untenable.—Such a proposition appears, indeed, at first sight to be in direct opposition to the common rules of reasoning, and the results of universal experience; by which we are taught never to attribute very general effects to causes of partial operation.—Of the numerous tribes and religious castes spread over the extended surface of Hindostan, it is every where known, that the common articles of diet, are almost as various as the

different denominations under which they themselves are ranged; and whatever mischief the eating of noxious rice, of the *Ouse* or any other crop, might cause amongst the Bengalese, with whom it formed a principal part of their food, it could hardly be expected to produce the same effects among the inhabitants of Upper India, who rarely, if ever, use it.—It has accordingly been found, that the Epidemick has again and again visited the sailors of European ships just entering the river, and previously to their having any communication with the shore; and has often raged extensively among Sepoys and other classes of Natives, who had not tasted rice for months, or perhaps years, before they were attacked.—Finally, the disease has in towns and detachments of troops been frequently observed to arise, come to a height, and die away, whilst the food generally employed continued exactly the same, before, during, and after its visit; and that food sometimes not containing one particle, and sometimes again, chiefly composed of rice.—Besides, that the inadequacy of this and every other cause of partially local operation, for the production of the disorder, has been clearly established in the foregoing account of its rise and progress; in which it is shewn, that it broke out simultaneously in many distant and unconnected spots.\*

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\* The theory here referred to, consisted in a belief, that the Epidemick was originally generated, and after-

- It thus appearing, that no theory yet proposed will stand the test of scrutiny, the question, in what consisted the Remote Cause of the disease must be abandoned as placed beyond the reach of human curiosity: or as at least inscrutable in the present state of our knowledge.—This much only has been shewn in the account of the weather

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wards wholly kept up, by the use of the blighted and noxious early Crop of Rice of 1817. The improbability of this hypothesis might be argued, from the extremely extensive course pursued by the disorder, and the likelihood, or certainty, of its having during that course visited many tracts, which the deleterious grain had never reached; from the disease having suddenly, that is within a few hours, largely affected the inhabitants of several towns, as Agra and Futiigur, in such manner, that its attacks were clearly referrible to corresponding sudden changes in the sensible properties of the atmosphere; and from other like circumstances. But its truth would appear to be quite irreconcilable with the following well authenticated facts; 1st. From the concurring and uncontradicted affirmation of many Officers, Military as well as Medical, who served with the Nagpore Subsidiary Force, at the period of its being attacked by the Epidemick, it appears that Rice, so far from being at that time the common food of any class of the troops, was very little used; and that many individuals, who had not tasted a particle of it for months, or even years, were yet carried off by the disease. 2d. From the reports of the Officer at the head of the Commissariat Department with the Centre Division of the Army, it is learnt, that Rice so far from being common in camp, could not be procured but with great difficulty, and at an

prefixed to this Report; that for several years prior to the commencement of the Epidemick, the seasons had in a very extraordinary manner departed from their usual course; that Easterly winds had prevailed to an uncommon degree;

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exorbitant price.—The Officers alone used it; and the Commissariat Agents, although they wrote and sent people in every direction, failed to obtain a supply, for the use of such Sepoys as were inhabitants of Bengal Proper, who of all our Native troops, are almost the only portion, which prefers Rice to Wheat. So that, while the Epidemick was raging with unheard of violence in camp, the Officers, that is the class whom we know to have been of all others most exempt from the disease, were the only persons who touched Rice. With the single exception of *Chuna* or gram, which was sometimes got from the neighbouring villages, all stores were here issued by the Commissariat. The depot books for the time give the following list of issues: viz. Wheat, *Ata*, *Dall*, *Chuna*, *Ghee*, Salt, *Huldee*, and Tobacco; and we are authorised to state, that no change whatever took place in the kinds or sorts of grain given out during the course of the campaign.—In like manner, the Natives of the Rajpootana and Hansi Force were supplied throughout, by the Commissariat.—The purchases were Wheat, *Dall*, &c. as above; and there was no Rice in camp, excepting a small quantity kept in store for the use of the Europeans in the event of bread unexpectedly failing them.—The Left Division of the Grand Army alone was not regularly supplied by the Commissariat but it is learnt from the Officer in charge of the Department in that quarter, that the troops and followers of all classes, chiefly used *Ata*, which was the principal article

and, that at the period of its rise, the atmosphere all over Bengal was excessively humid, from the previous great and long continued falls of rain.—But, whether this unseasonable and wet state of the weather, itself produced and constituted the vitiated condition of the air; or was a mere casual accompaniment and adjutory to some more hidden means of corruption; it is not in our power to determine.—It may, however, be remarked, that the surface of Bengal was then in a condition very similar to that of Lower Egypt,

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of supply in the Bazars. But, without taking into consideration the results of experience, a simple reference to the period of the first rise of the Epidemick, as contrasted with that, at which the *Ouse* crop of Rice is reaped, will prove, that the hypothesis under review was from the first wholly untenable. The seed of the *Ouse* Rice is sown between the 1st and 20th day of June, according as the Rainy Season happens to commence early or late; and the plant is cut from the middle of August to the middle of September. Now from the first Section of this Report, it clearly appears, that the Epidemick first began in Nuddeea and Mymensing in May; that it raged extensively in June; that in July it had reached the far distant districts of Dacca and Behar; and that it was generally prevalent throughout the whole of the Lower Provinces in August and September.—It is almost unnecessary to point out the conclusion.—That the *Ouse* Rice of the season could not be the cause of a distemper, which largely existed, when the plant was yet green; nay had shewn itself, when the seed had not yet been thrown into the ground. •

during the period of its annual inundation; and that Egypt and the neighbouring country of Ethiopia, "have been stigmatised in every age, as the original scurce and seminary of the plague."

Having failed in discovering the primary agent in the generation of the pestilential venom, we should next enquire, by what means it would appear to have been propagated; and what circumstances seemed most readily to bring it into action, in places in which the atmosphere was already predisposed for its reception?

Perhaps the most singular fact in the whole history of the disease, was the predilection which it shewed to spread in one particular direction.—From the remote period of its first appearance in the Eastern parts of Bengal, in the autumn of 1817, to the hour of its arrival on the Malabar Coast, as has been seen in a preceding part of this report, its path was almost uniformly from East to West; and, if we may be allowed so to express ourselves, it seemed so bent upon pursuing this Westerly course, that rather than deviate from it in an opposite direction, it would for a while desert a tract of country, to which it afterwards returned under circumstances more congenial to its disposition.—Thus, although it appeared in the beginning of November, 1817, on both banks of the Jumna near Sher-

gur, it did not then shoot Eastward across the Doab ; but, leaving all on that side of the river untouched, spread far and wide through Bundelkund, and all the districts to the West.—In like manner, when it had reached Cawnpore in the following spring, it shewed a marked aversion for Bareilly and the other tracts east of the Ganges ; but readily stretched through the Doab to Agra, Coel, Delhi and Meerut ; and thence far to the West, by Hissar, Jeypore, and the detached camp of the Rajpootana Force.—To give another instance.—Although Allahabad, and the whole of that District, was largely afflicted in March, the infection was not thence communicated to Sooltanpore, Fyzabad, Oude, and the Districts bordering on the Gogra and Goomtee; but from the South East quarter, by the way of Tirhoot and Gorruckpore.—The case of the small Cantonment of Mulhye on the Eastern frontier of Tirhoot, which would seem to have received the disease from the West, and of one or two other places, in which the range of aberration was very limited, need not invalidate a rule deduced from an observance of a general course extending several thousand miles.

From knowing, that during the existence of former pestilences, the diffusion of the virus could be frequently traced to the motion of particular currents of air, it was natural to look for an explanation of this extraordinary regularity of pro-

gression in the prevailing course of the winds during that period.—Accordingly, upon reference to the various reports of the rise of the disorder in different parts of the Country, it was discovered, that in a vast majority of instances the wind was blowing from the East or South East quarter, at the time of its breaking out.—This may be stated to have been almost without exception the case in Bengal; throughout which the Epidemick arose in the Rainy Season, when the wind blows almost invariably from the South East.—In Calcutta, Nuddea, and many other places, indeed, the influence of particular directions in the wind was so evident, as to have at length almost justified a prediction, that the abatements and aggravations of the disorder would certainly correspond with their alternations.—Thus in Calcutta, it declined in virulence and frequency as the Northerly wind set in, in November 1817; and again recurred with a South East wind in the following February.—Its reappearence, again, in April 1818, was preceded by a continuance of wind from the North East: an uncommon quarter for that season of the year.—So in Nuddea, the disease declined for a few days on the wind blowing steadily from the North; but no sooner had it again veered to the East, than it recommenced its ravages.—The same prevalence of Easterly and Southerly winds attended its progress through Tirhoot, Sarun,

Behar, and Shahabad.—At Moozufferpore, Buxar, and Ghazeepore, this had been the prevailing wind for some time before its appearance.—In the camp of the Centre Division of the Army, the wind, which from the 21st of the preceding month had blown strongly from the West, suddenly changed round to the East quarter on the 7th November ; and there are grounds for believing, that from that day the disease raged in camp.—With the Left Division again, the wind ranged from East to South, from the 1st to the 14th of April.—The Epidemick was with them on the 9th, and abated as the wind came round to the West.—The state of the winds is unfortunately omitted in the returns from the Nagpore Force.—With the Rajpootana Force they are stated to have been variable ; but in Jeypore, Brigadier Arnold's Camp, Agra, and other stations of Central India, they were Easterly during the prevalence of the disease.

It must be admitted, that to this rule there were several striking exceptions.—Thus at Benares, Juanpore, and other places visited by the disease in April and May, the hot Westerly winds blew during the whole period of its continuance ; and at Futtygur it shewed itself on the morning succeeding the occurrence of a severe North Wester : until then remaining unseen, although an Easterly wind had for a considerable time before existed.—Nay, in Delhi, the Epidemick broke

out the moment the Easterly wind, which had been very unseasonably blowing during the previous months, gave way to Westerly breezes; and departed as they withdrew.

These exceptions, however, were not very numerous; and when placed in contrast with the innumerable instances bearing towards the opposite point, are not of such magnitude as to overturn the general deduction, which we now venture to draw: that the appearance of the Epidemick in any particular place was usually accompanied or preceded by an Easterly wind; and that there was apparently some connection between the dissemination of the pestilential virus, and the prevalence of currents from that quarter.\* Of the nature of that connection we cannot speak certainly; nor can we tell, whether those currents, acting as a vehicle of the poisonous matter, carried it along with them from one infected spot to another previously healthy; or acted merely from their superior moisture, in the light of a strong exciting cause, eliciting the disorder in places, where the virus had previously existed, although it were not yet brought into action.—In favour of the former supposition, the progress of the Epidemick in the Upper Provinces may be cited; where the disease broke out in different places, at such in-

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\* The more frequent occurrence of the disease during the prevalence of South Easterly winds, is noticed by Avicenna.

tervals of time, and in a manner so like regular succession, as almost to warrant a belief, that it was communicated from town to town, after the ordinary laws of consecutive propagation.—It would be mere repetition again to quote the numerous instances, in which the disease in this manner travelled from place to place.—A reference to a former Section will prove to the reader, that along the banks of the Jumna, and thence Westward to Jeypore, Bundlekund, and the Mahratta States, it seemed very constantly to spread in this manner; and will leave him almost satisfied, that there at least, the virus must have been diffused and propelled by the winds.—In Bengal on the other hand, it is hardly possible to conceive, that the Epidemick benefitted by any such mode of propagation. In that quarter, it got head at nearly one and the same time, in many distant parts of the Province; and would appear to have been quite independent of all auxiliary means of dissemination.—It may be conjectured, that as the Lower Provinces were unquestionably the primary seat and seminary of the disease; the whole encircling mass of the atmosphere was there in such a state of distemperature, that nothing beyond the common exciting causes was required, to set the virus in action in particular parts; while in Upper India, the air, being less corrupt, required for the production of the Epidemick, an admixture of more vitiated currents,

which were borne along by the winds.—In this view of the case, the agency of the wind, setting aside the effect of its dampness, must be held to have been purely mechanical.\*

To what cause are we to ascribe the marked disposition of the disease to follow the course of rivers? This tendency was observed in so many instances, that it can by no means be considered to have been accidental.—From the rise of the disorder on the banks of the Ganges and Burrumpooter to its arrival at the mouths of the Nerbudda and Taptee, it excited the surprise of the Medical observer.—Thus from Sonergong in the Dacca District, where the Epidemick broke out in July, 1817, it crept along the banks of the Megna to Naraingunj and Dacca; attacking itself chiefly to the ferries and market places in its vicinity.—In like manner, it afterwards step by step advanced up the Burrumpooter; affecting during its transit the villages situated on both its margins.—From the mouth of the Hooghly to its termination in the Ganges near Moorshe-

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\* In the South of India the rise and progress of the Epidemick were thought to depend in some measure upon the state of the Moon; but a careful comparison of the tables of the weather prefixed to this Essay, with the periods at which the disease broke out in different parts of these provinces, has clearly shewn, that here at least, no connection could be traced between its increase and decrease, and those of that planet.

dabad, the same peculiarity was observable.—The shipping at the New Anchorage, at Diamond Harbour, and along the whole channel as high as Hoogly was particularly affected;\* and almost every village adjacent to its banks buried many of its inhabitants.—In the Bhaugulpore district the propensity was so strong, that the virus scarcely ever spread into the interior, whilst it almost depopulated the low lands near the Ganges. Again, in the autumn of 1817, Muzzupperpore, and the villages along the Gunduk river in Tirhoot, and the station of Chupra on a branch of the Ganges in Sarun, were alone visited ; while at a subsequent period the disease was thence communicated along the Gogra to numerous cities in the North East quarter of our territories.—From Allahabad upwards, along

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\* The Epidemick attacked the Honorable Company's shipping at Diamond Harbour and the New Anchorage with its usual irregularity. The first cases appeared on board the Astell, lying at the former station, about the 20th September. The weather was moderate, with South Easterly winds, and showers of rain. Thermometer 84. Then, in the first week of October, it got on board the Phoenix ; which was moored near the muddy, slimy shore of the river. The weather had now grown very sultry : the Thermometer averaging 86 pight and day, and scarcely a breath of wind stirring. The first fatal instance at the New Anchorage occurred in the Warren Hastings on the 7th October. The weather had been cloudy, with variable winds, and occasional rain ; the

the channel of the twin branches there forming a junction, until the virus was lost under the hills, it wavered so little from the line of those rivers, that hardly a town or village lying remote from their course was brought within its influence. Without going further over our old ground, let us briefly state that the same rule held yet more unexceptionably in Rajpootana; through the province of Bundlekund; and all

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Thermometer varying from 86 to 88. The case of this vessel is somewhat singular. A seaman was attacked on the morning of the 10th and died at ten o'clock. In the afternoon a party went on shore on Saugur Island to bury him. On their return to the boat, the man who had been left in charge was found lying convulsed in its bottom; and died at four next morning. Then the boatswain was seized, and after lingering to the 15th, sunk under debility. During the ensuing five days eight others were taken ill (whether of the burying party or not, is not mentioned) but in a slighter degree, and all recovered by bleeding, anodynes, and calomel. At this time, the other vessels had only one or two cases each; and the General Hewett remained perfectly healthy; which could only be accounted for, from her men not being allowed to go on shore, and wander in the marshy rice fields, and being otherwise carefully protected from the sun and damp. About the end of October the wind became Northerly, the air serene and cool, and the ships more healthy. The South East wind blows over a great tract of swamp and jungle, and always renders these stations very sickly during its prevalence.

along the Nerbudda to the numerous branches of the Chumbul.

If we enquire into the causes of this apparently extraordinary propensity, we shall find, that they are not of such difficult solution, as they would at first sight appear to be.—It is to be recollect<sup>d</sup>, that in India, as in all other countries, the inhabitants flock to the neighbourhood of rivers for the purposes of commerce ; and that the greatest number of towns and cities will thus be found near navigable streams ; whilst the banks of every rivulet affording the prospect of gaining a livelihood by fishing, will be crowded with villages. It is perfectly plain, that the population being more thickly gathered in such situations, must always suffer more, on occasion of any general mortality, than more thinly inhabited portions of the country.—This cause alone would appear sufficient to explain away the apparent anomaly r. o v under consideration. But there is yet another reason of equal force. The vicinage of rivers, from the action of the sun upon the great body of water contained in their beds during the day, and from the influence of the water on the circumambient air during the night, must always be peculiarly subject to those vicissitudes of temperature, which are known so powerfully to influence the state of the Epidemick.—Hence great evaporation by day, and falling of fogs and heavy dews by night ; and hence a constant in-

interchange of hot and cold currents : all strong exciting causes of the disorder.—To all which, if we add their low, muddy, sedgy banks, and the other numerous sources of miasma usually found in their confines, we shall be at no loss to account for the great sickliness of those residing on their banks, without searching for any more hidden causes of the fact.

It has been shewn in the beginning of this Section, that the rise of the Epidemick was in no way derivable, from any preceding vicissitudes in the sensible properties of the atmosphere, or other circumstances of purely local operation.—It is nevertheless, certain, that the virus, being once on foot, its condition and mode of action were materially affected by such localities of situation, as were before inadequate to its production.—Thus, there is abundant proof, that in high, dry, and generally salubrious spots, it was both less frequent in its appearance, and less general and fatal in its attacks, than in those, that were low and manifestly unwholesome.—This, indeed, might have been previously concluded, from a general observance of the different course pursued by it, in the low and stagnating climate of Bengal, where having once gained ground, it tarried for years ; and in the pure and elastic atmosphere of the Upper Provinces, in which it was slowly received, and quickly lost.—But, if we trace it in its progress through different cities

and tracts of country, we shall find this modification of its agency according to difference of situation, almost invariably taking place.—Jessore, the place in which the disorder first put on a very malignant form, is a crowded, dirty, ill ventilated town; surrounded at all times by a thick jungle; and in the Rains by an immense quantity of stagnant water.—Here accordingly, the disease did unspeakable mischief; and its ravages were not diminished, till the inhabitants abandoned the city; and thus got rid of those causes, which had a manifest effect in aggravating its virulence.—Sunergong, Dacca, and the other places in that neighbourhood severely visited by the disease, are completely encircled by clumps of trees, and heavy underwood, of various sorts.—But, in Sylhet the influence of situation was perhaps more remarkable than in any other quarter.—From the uniform result of queries sent round to the Police Officers of the different departments, into which the district is divided, it appeared, that the villages in which it raged most extensively, were considered by the Natives, as comparatively unhealthy, and obnoxious to fevers of the intermittent type; being exposed to the effluvia arising from marshes and extensive lakes, in which the Zila abounds; particularly towards the South West Division, where the greatest number of victims fell.—The Sepoy Lines, on the contrary, being placed from sixty to a hun-

dred feet above the general level of the country, had scarcely any cases ; excepting such as occurred in persons on guard at the different outposts.

In Calcutta, again, the disease was, from first to last, most prevalent in the lower parts of the town, and suburbs ; as the Bura Bazar, Simeleia, Dyahutta, and Suwah Bazar ; and in the suburbs, the Villages of Khidderpore, Bhuwanipore, Manicktolla, Kurrya, Entally, Chitpore and Seal-dah.\*—These dependencies are every where intersected by pools, broad ditches, and channels ; which, being imperfectly drained, are in the Rainy Season always full of stagnant water, and rank

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\* Much of the sickness of Calcutta was no doubt owing to the general overcrowded state of its population ; to the intermixture of Native with European habitations ; to the numerous collections of stagnant water, and filth of every sort, in many of its most centrical parts ; to the depth and thickness of its boundary hedge to the North, East, and South ; and to the immense quantities of trees and underwood spread over the whole of its scite. A knowledge of the extent of the population of the city is yet a desideratum ; no accurate census having hitherto been taken.—It has been variously conjectured, at six hundred thousand, a million, and a million and a half.—There are however, strong grounds for believing, that within the last thirty years it has been trebled ; and even doubled within the last ten years. Several causes have concurred to occasion this rapid augmentation. As trade and mercantile enterprise have increased, and branched

weeds. From this plentiful source of corruption, foul air is constantly given forth; and as all ventilation is obstructed by large groves of trees, and vegetation of every description, it is there concentrated, until it becomes entirely unfit for the purposes of respiration.—The miserable condition of the generality of the inhabitants of these villages is hardly to be imagined.—Each hamlet is made up of many mud or straw huts, generally from six to twelve feet square, placed so close to each other, as to leave scarcely room

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out into many new channels, the concourse of European settlers has become greater.—It may, perhaps, be assumed to have increased in a quadruple ratio within the last ten years; and more especially since the Trade was thrown open. When it is considered, that every European settler of any consequence attaches to his person from ten to fifty Natives, and gives employment perhaps to double that number; it will be acknowledged, that from this cause alone, a very sensible augmentation of the inhabitants must have arisen.—Then there is the rapid increase of Countryborn Christians, who too, have their followers, among whom must be reckoned, not only domestick servants, but persons to whom occupation is given out of doors.—Lastly, there is the large body of seafaring men, variously connected with the vast quantity of shipping now employed in the port; and of Native workmen engaged in the Dock-yards, Cotton Sciews, and other large establishments connected with its Trading interests.—The whole of the above descriptions, are in some measure dependent upon, and increase in an equal ratio, with the European settlers.—But, what

**to pass between.**—In every one of these wretched hovels, a whole family, sometimes consisting of six or eight persons, resides ; and not unfrequently cows, pigs and other domestic animals add to the filth and foul atmosphere in which they abound.

—The singularity is not, that persons so situated should be more than others subject to the influence of a prevailing Epidemick ; but that they should ever be free from maladies of this description.—The higher classes of Natives, and Eu-

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they be strictly denominated the *Native population* of the city, has owed its great increase to other, and perhaps more powerful causes.—So long as the stability of the British Empire might be deemed precarious, wealthy Natives felt perhaps some hesitation in placing their families and property, in what might be deemed, an insecure situation.—Every scruple of this sort has now disappeared ; our arms have triumphed over all opposition ; the Native principalities have crumbled down ; and Calcutta has grown out of their wreck. It is now the capital of India ; and to it people of every class and denomination repair, as to a place of perfect safety. Hence, it may be almost taken for granted, that this part of the population has lately gone on augmenting equally rapidly with that more immediately connected with Europeans ; and that the town, taken as a whole, now contains twice as many inhabitants, as it had in the end of the last century.\* Meanwhile, its limits remain precisely

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\* It is the opinion of one of the most intelligent of our Magistrates, that the population of the city within the Mahratta Ditch, does not fall short of eight hundred thousand ; and that during the day it is augmented to a million, from the influx of mechanicks and labourers of all descriptions from the suburbs.

Europeans generally, inhabiting the better raised and more airy parts of the town, suffered proportionally less than the lower ranks.—A striking instance of the good effects of airiness in affording immunity from attacks of the disease, occurred in the great Native Jail of Alyapore.—Although this building contained several thousand persons, scarcely a case appeared in it; whilst the same.—The expedient fallen upon to avoid their extension, has been to erect five or six houses on the same space of ground, on which one formerly stood; so that to the evils arising from over populousness, have thus been added those of over crowding.—A great mischief consequent on the internixture of European and Native dwellings, has been the accumulation of filth in every vacant space.—Even the most centrical and valuable parts of the city are not free from this nuisance.—Immediately to the East of the Government House, and in rear of the Esplanade Row, and Cossitollah, there is a stagnant pool, in which the whole neighbourhood deposit their filth, and whence a stench of the most noisome and injurious kind frequently proceeds.—The rear of Durrumtollah, the Lal and Bow Bazar, and of Kulingah; and indeed the whole of the Native portion of the town, abounds in such sinks of putrefaction, and loudly calls for improvement.—The proper authorities will best judge of the means calculated to remedy these evils; but it may not be improper to mention in this place one or two circumstances, the adoption of which would undoubtedly improve the salubrity and beauty of the city.—1st, To open long and broad avenues from the Circular Road or outskirts of the town, to some distance into the country; and thus to break up

the prisoners employed at the outposts, and labouring in the sun in cleansing drains during the day, and sleeping in mud buildings at night, were very sickly.—So the Native Insane Hospital built in a low swampy spot, and such parts of the shipping as lay near the slimy banks of the river, were likewise peculiarly subject to the disease, whilst on the other hand, the dry Jail of the Court of Requests, containing nearly four hundred debtors, continued nearly exempt.

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the present almost impenetrable bound hedge.—2d, To form open, wide streets, with occasional squares and tanks, in the body of the city.—3d, To break up the numerous nests of huts, in the European part of the city, by purchasing the ground on which they are now built, and allotting new ground in its stead in the suburbs.—4th, To fill up all the unwholesome tanks and foul puddles and ditches.—5th, To improve the draining, if practicable.—6th, To disuse the present European and Mussulman Burying Grounds, which lie exactly to windward of the most populous part of the city during the unhealthy season; and to form others to the North or North East of the town. Lastly,—To diminish the number of trees, and thin the jungle in the town and suburbs.—Some measures of this sort will soon become imperiously necessary to prevent the city from becoming, under its daily increasing population, as proverbial for unhealthiness, as Batavia, or Spanish Town, Jamaica.—The community of Calcutta is greatly indebted to that excellent and indefatigable Magistrate, the late Mr. Eliot, for the many great improvements introduced by him. It was under his superintendence that the city, which ten years ago was a

On proceeding upwards we shall observe the same unerring influence of situation.—In Nuddeea, high and dry places, and upper roomed houses, were more free than low and marshy spots, with luxuriant vegetation.—In the Barracks of the European Regiment at Berhampore, of twenty-four casualties, seventeen took place in the four Companies inhabiting the lower range.—This range was very damp, and had in its vicinity to the North East an extensive swamp, from which an offensive stench proceeded.—The disease shewed no variety of appearance in Rajshahy, because the town of Nattore, and almost every village in the District, are equally surrounded by ditches, full of stagnant water, and filth of every kind. But in Malda, only the villages lying in the flats near the Mahanuddee River were attacked.—In Bhaugulpore, all the lofty open country escaped, whilst those parts most subject to fevers, suffered severely, as Calcapore, Rajmahl, Peealapore, Tarapore, and Luchmumpore.—The troops and followers in the cantonment of Carringur entirely escaped; although two villages situated immediately on their boundary ditch suffered dreadfully. But the cantonments were seventy two feet above the villages.

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perfect swamp in the Rains, was first properly drained.—It is melancholy to reflect, that he fell an early victim to the Epidemick, whilst maturing and carrying into effect those curative measures, which saved the lives of thousands.

When the disease appeared first in Tirhoot, there had been a previous unusual inundation; and the low villages near the river were alone affected.—So in Sarun, the disorder arose shortly after a branch of the Ganges had rapidly fallen, and left the town exposed to the noxious smell proceeding from its large oozy bank.—The only place, accordingly, left unaffected, was the Jail; which was clean, airy, and situated in an open space at a distance from other buildings. The same favorable localities nearly saved the Tirhoot Jail.—In the dry and well-ventilated cantonments of Mullhye, only three instances of the disease occurred; while the neighbouring villages, which were remarkable for their filthy and close state, were so sickly, as to be deserted by the inhabitants. So in Poerneea, the lines of the Provincial Battalion and Jail were quite exempt, when the disease was extensively fatal in the town.—In the valley of Napaul, all the villages enjoying a pure air on the slopes of the hills remained free; whilst the towns of Khatmandoo, Patun, and Bhatgoon, in the vicinity of which there was much putrid matter, and many channels of stagnant water, were severely visited.—In Benares, the disease was chiefly confined to the lower classes of Natives living in wretched huts.—In like manner, at Lucknow, the cantonments, built on a dry and sandy soil, elevated somewhat above the general surface of

the country, enjoyed nearly entire immunity; when the low and crowded city was greatly ravaged.—That nothing in the condition of the Sepoys themselves, was the cause of this good fortune, was very evident, both here and at Mullhye, by their becoming affected upon proceeding on guard to places within the range of the unhealthy action.

The same variation of freedom and exemption, was observable in almost all the towns on the Jumna subjected to the Epidemick—Agra, an airy, open, clear town, was comparatively free; Muttra, a filthy place, with crowded bazars, was severely scourged. The cantonment of Nomilla, adjacent to Agra, being high and perfectly clean, was hardly touched.—How different was it with the cantonments of Muttra.—There the disease, after remaining in the city from the beginning of the month, on the 27th of June got into the lines of the 4th Regiment of Cavalry.—These formed the most distant part of the cantonment, being fully two miles off; but were placed on very low ground near the banks of the river.—In them the disorder was most severe. From these lines it next visited those of the 1st Regiment of Cavalry; then those of Captain Gillman's Levy, and lastly, those of the 12th Regiment of Native Infantry: a mile nearer the town. In the whole extent of this line, the ground gradually ascends from the river. Surely, no stronger proof

than this could be given, of the influence of locality in modifying the prevalence of the disease.—In Alligur the Jails, cantonments, and a ~~number~~ of villages continued healthy ; whilst the ~~towns~~ were ~~cherished~~, and fed in the filthy, and crowded ~~towns~~ of Coel.—Thus too, the thickly populated ~~towns~~ close lanes of Delhi suffered more, than the rectangular and spacious streets of Jeypore ; and the low and nasty town of Saharunpore more than the city and cantonments of Meerut. So the military lines of Saharunpore had not a case, when the inhabitants of the town were very sickly.

We might go on enumerating many other instances of a similar partiality, were we not afraid of tiring the reader's patience, without adding further strength to the position, which we are now endeavouring to maintain.—We shall, therefore, close with the mention of the Centre Division of the Army, and the Rajpootana Fenc. With the former, in the three grounds of encampment, in which the disease prevailed most, Terayt, Talgong, and Silya, the soil was low, and moist ; the water foul, stagnant, and of bad, brackish quality ; and every where not more than two or three feet from the surface of the earth ; and the vicinity abounded in animal and vegetable putrified matter.—Whereas, at Erich, where the Army regained its health, the situation was high and salubrious ; and the water clear, and pure from a running stream.

The Rajpootana Force, previously to the appearance of the disease, was encamped on a ridge of sandy soil, sloping for a mile or two to a much lower tract.—Both the immediate scite of the encampment, and the surrounding plain, were covered with long slender grass; but this was thicker to the left of the camp, where the declivity was too gentle to allow the water to flow off speedily.—On this side of the line, the disease broke out earlier, and was throughout more violent, than in its right division.—No reason could be assigned for this irregularity of action; except that in the one part, the tents were pitched higher, and were consequently drier, than in the other.\*

\* Some peculiarities respecting the ground of encampment of this Division, which have not found a place in the text, may be noticed here. The camp was pitched on a plain of considerable height; with hills to the North and West, distant three or four miles. There was no river in the vicinity; but frequent small, clear streams with sandy or gravel beds, often terminating in ponds. The neighbouring soil was little cultivated; a few fields of Indian corn and maize being the only grain to be seen. The plains were overgrown with slender, light grass, wild plum thorn, and swallow wort. The hills were almost bare. The water was generally found at a distance of eight or ten feet from the surface; and was brackish in many wells. There were no marshes, or foul stagnant water near. The disease commenced on the 14th. The Rains had not ceased. On the 17th the troops made a short movement in different

Amidst so many proofs of peculiarities of situation influencing the Epidemick, it is not intended to deny, that in the vast range which it took, there were many places, in which it not only failed in observing this rule, but even seemed to go right in the face of it. Thus, there were even whole districts, as Cawnpore and Juanpore, in which it affected all parts alike; without reference to their being high or low, damp or dry :—Others again, in which, though divisions, then halted for two days from bad weather; and again moved on the 20th to more favorable ground. A stationary camp then became necessary from the increasing numbers of sick. Luckily, the disease left them soon after this. The Rains continued with little variation to the 21st, with changeable winds. After the 22d, the wind was chiefly from the North West with heavy dews, and a clear atmosphere during the day: with exception of a few showers towards the end of the month. The mean heat of the month was 77 at sun-rise; 86 at noon: fluctuations from 75 to 82 at sun-rise; and 81 to 93 at noon. Nothing remarkable could be discovered in the condition of the troops. They had recently been employed in the reduction of the Fort of Madhoorajgur. Their supplies of food and water were such as they had before generally used. Another division of the same force commanded by Brigadier Knox, which was encamped on nearly similar ground in the valley of Ajmeer, was not at all visited by the Epidemick.

Little can be said of the local peculiarities, under which it appeared in the Left Division of the Army, since the troops were daily changing ground, both before, during, and after the period of its prevalence. All had been

it affected particular lines, and villages, its liking for those parts, was not to be explained on the supposition of greater general insalubrity, than that of the spots avoided by it. Lastly, there were even instances of its shewing a preference for dry and wholesome, over damp, and aguish situations: as in Allahabad, in which the lines of the Native Artillery Details, lying in the low

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for a long time before on v·ry active, harassing service. The main body, under the command of Major General Marshall, after moving from Seronj to Beresina, proceeded on the 1st of March to Kimlassa; where on the 5th they were joined by several corps commanded by Brigadier General Watson. All were then healthy. The whole Force now marched to Saugor, where they halted from the 10th to the 16th; then to Dhamony, which they besieged from the 18th to the 27th. Then they moved southerly, towards Jubbulpore. During March, the Thermometer ranged from 48 to 65 at Sunrise; and from 74 to 97 at noon, in tents. For 18 days the winds were from the North and West, with clear atmosphere; the remainder from the South and East, with slight rain on the 26th from the West. The prevailing diseases were fevers, with congestions of the liver, and brain, and diarrhoeas from eating unripe grain. The troops got the Epidenick at Jubbulpore on the 9th or 10th of April, and carried it along with them in their march to Mundela, which they reached on the 21st. In the end of the month they moved back to Saugor, where they arrived on the 24th May. The state of the weather during April has already been described. Nearly the same fatigue was undergone by the troops, in reconducting the train and stores from Mundela to

and swampy suburbs of the city, and much exposed to putrid animal and vegetable exhalations, were alone spared ; while those of the European Invalids, which stood high and dry, and all around, was largely infected with the virus. But these exceptions were comparatively few in number ; and should not be allowed to affect the general conclusion, founded on the large body of affirmative evidence previously adduced : that

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Saugor in May, as in the two former months ; whilst the heat had considerably increased :—The Thermometer ranging from 74 to 80 at sunrise, and from 94 to 109 at noon. Early in the month, storms were frequent from the North and West with heavy showers; from the 8th to the 27th the wind was generally westerly, hot and dry ; then there were a few days of cloudy calm weather; and at the close, strong gales from the North and West, with rain. Fever, tertian and remittent, and diarrhoea were frequent. Cholera continued in the 28th Regiment, but less violent ; and reappeared in the 14th, which had been some time exempt; and in a Detachment of the 26th, which had come in from Koray and places adjacent to Saugor. A few cases also occurred in the Artillery, but the other corps now kept quite free. All along, the Division had abundance of provisions ; the supply of water was from streams.

The disease attacked the Nagpore Force when encamped on high ground, in a fine dry country, with neither jungle nor hills for many miles round—In like manner, there was no jungle or marsh in the vicinity of Hansi ; and the whole country, through which the troops moved during the prevalence of the Epidemick, was open and elevated.

the power and range of the Epidemick; the poison being once afloat, were always increased by such causes, as experience has shewn to exercise a marked agency in the generation and dissemination of Jail, Bilious, Remittent, and Intermittent fevers.

Is the entire immunity of lofty and mountainous situations attributable merely to their being, from their greater altitude, less surrounded by those vapours, and less exposed to those extrinsic circumstances, which subjected the lower lands to the influence of the disease? Or, was the peculiar poison of the Epidemick confined to the inferior strata of the atmosphere? That this was not invariably the case, was proved, by the pestilence getting over the high chain, which divides Nypaul from Tirhoot, and Munnipore from Sylhet.—But the difficulty, with which it appeared to ascend these heights, and the perfect immunity of the elevated fortresses of Rhotass,\* Adjeegur, and Kallinjur; of Kumaon,† the Dhoon, and the hilly parts of Rajpootana, while all around them was infected,

\* We are assured, that whilst the villages situated near the woody base of Rhotas mountain were suffering dreadfully, the only man residing near the top of the hill affected, was one, who went down and caught the disease in the plain.

† Kumaon has since been affected by the disease.

would rather incline us to believe, that there was something in the air of elevated situations intrinsically hostile to the existence of the poison.

## SECTION VI.

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### OF THE CONTAGIOUS NATURE OF THE DISEASE.

THE next point to be investigated, is, how far the pestilential virus of the disease was communicable by Contagion.—If by Contagion, is meant, the communication of the disorder from person to person, by means of contact, or close conversation ; then, in this strict sense of the word, Cholera is certainly not contagious.

In the absence of all positive proof, such a conclusion might have been fairly drawn, from its being observed, that in no quarter of India, during the time in which it was so sadly scourged by the disorder, did its infectious nature form any part of the popular belief.—Amongst a rude and superstitious people, the unexampled mortality caused by it, was, according to the fancy of the individual, ascribed to fatality, to the agency of malignant spirits, or to the anger of an offended deity: but it does not appear to have been once suspected, that its amount was increased, or diminished, by

the free, or restrained intercourse of men.—It may be said, in diminution of the weight here attached to the popular persuasion, that the opinion of the vulgar is usually founded on misconception, or guided by caprice; and is therefore, of little, or no value.—This is no doubt true, in respect of subjects, either foreign to their interests, or too recondite for their understandings.—But, in matters of daily observation, and especially in those narrowly concerning the interests and safety of all, there is perhaps no fairer criterion of truth, than the common judgments of mankind.—The progress of any generally fatal disorder is exactly of this description; and accordingly we find, by looking into the histories of all the great epidemical and infectious distempers, to which the human race is subject: as the plague, small pox, measles, and scarlet fever: that the people were never slow to discover their true nature; and ordinarily passed such judgments regarding them, as corresponded, not merely with the opinions of more learned observers, but with the truth itself.—So it is in the case of the present Epidemick.—The whole body of the Medical Officers in Bengal, who have had an opportunity of seeing, and remarking on the disease, without a dissenting voice, concur in declaring, that it is not contagious.\*

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\* To this unanimity of conviction there was originally one exception; but from more extended experience that individual has since modified his opinion.

But, as neither the universal current of popular belief, nor the unanimous testimony of persons of the largest observation in the disorder, and most in the habit of weighing medical evidence, may be deemed sufficiently weighty to decide the point; let us see, how far, a belief in its contagious nature, is consistent with the facts of the case.—It may, then, first be remarked, that the rise and progress of the disorder, were attended by such circumstances, as shewed it to be entirely independent of contagion for its propagation.—Thus we have seen, that it arose at nearly one and the same time in many different places; and that in the same month, nay in the same week, it was raging in the unconnected, and far distant districts of Behar and Dacca.—It will not be argued, that the virus travelled, or was conveyed, over the many hundred miles intervening between the cities of Patna and Dacca, within a few days; since all experience proves, that where it really did appear to be communicated from place to place,—as along the course of the Jumna—its march was exceedingly slow: scarcely averaging a few miles a day.\*

\* The distances, and successive periods of affection, may be marked in a few instances.—From Allahabad to Cawnpore, a distance of perhaps 120 miles, the disease took from the end of March to the second week of April to travel; from Allahabad to Etawah, 180 miles, a month; from Etawah to Futtigur, 60 miles, fourteen days; from Etawah to Agra, 70 miles, a month; from Agra to Coel, 40 miles, ten days; from Agra to Delhi,

But, again, the whole habitudes of the disease, when once it had entered a town or camp, proved, that it was not kept up by infection. Instead of daily increasing, and being perpetuated by the very means on which it fed ; it invariably ran a regular course of increase, maturity, decay, and extinction.—Thus, in the Centre Division of the Army, it began on the 7th of the month ; was at its height from the 16th to the 22nd ; declined to the end of the month ; and finally disappeared about the 2d or 3d of December. • So in the Left Division of the Army, it commenced on the 10th of April ; was at its full in the middle of the month ; declined from the 21st ; and died away before the beginning of May.—The case of the Nagpore Force is somewhat different.—The corps composing it fell at once into a medium already fully impregnated with the poison ; and, without passing through the primary stage, or that of increase, immediately had the disorder in its most violent form.—The only effect of this change of circumstances, however, was to dimi-

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100 miles, 20 days; from Delhi to Meerut, 28 miles, nine days; from Delhi to Jeypore, 150 miles, a month; from Jeypore to the Camp of the Rajpootana Force, 25 miles, fourteen days; from Jubbulpore to Nagpore, 180 miles, forty days.—From this comparative statement, it would appear that, admitting the successive propagation of the disorder, it observed no regularity as to time.—The distances are, it must be observed, marked from conjecture.

nish the usual period of the revolution; for the disorder which began on the 31st of May, had abated previously to the 5th, and nearly disappeared soon after the 18th of June. In the Rajpootana Force, the sickly period was still shorter.—The disease appeared on the 14th of September; and continued violent to the 20th; after which it gradually declined till the 1st of October, when it wholly disappeared. Lastly, in the Hansi Division, it observed the same regularity of course; beginning on the 6th of August, increasing in severity for a time, and gradually becoming extinct towards the end of the month.

Now, this uniformity of rise and declension, appears to be quite inexplicable, upon the supposition of Contagion.—For, if the virus were capable of reproducing itself, through the medium of the effluvia or secretions of individuals already infected; it must have gone on augmenting, until it either had no longer subjects, upon whom to exercise itself, or were counteracted by some means more powerful than itself: as uncongenial seasons; or segregation, and the other prophylactic expedients, resorted to on such occasions.—Such at least, is the course commonly pursued by those great scourges, the small pox and the plague.—These, when once unfortunately introduced into a city, or tract of country, not only for a time remain attached to it; but, manifestly depending on contagion, go on daily increasing, and perpetuat-

ing themselves by fresh accessions of infectious matter, until they either have depopulated the place; or are checked by some of the counteracting circumstances just mentioned. Hence the frequent necessity of seclusion, and of a strict observance of all those salutary regulations, which, under the name of Quarantine Laws, have been, in times of such jeopardy, devised to secure the general safety.—Had the form and progress of the present Epidemick, suggested the expediency of similar safeguards, they would no doubt have been proposed, and generally practised, wherever it appeared.—But, excepting the step, wisely adopted in some of the camps in which the disease largely prevailed, of moving from the vicinity of the dead, in quest of higher ground, and of a purer atmosphere—a step which could have placed no check upon Contagion, as many of the sick, and all the infected baggage, accompanied the main body,—no means of security whatever, seem in any case to have been thought of. The truth is, that all men were convinced, that they were wholly unnecessary.

The opinion of the medical observer was, in all situations, founded upon his noticing the following facts.—In his attendance upon patients labouring under the disease, he did not find himself, or his assistants, more liable to be attacked by it, than such persons, as had no communication with

the infected.\*—He could not attribute his escape to the effect of precaution ; for he took none ; nor to the limited nature of his intercourse with his patients ; for the disorder, and the remedies employed in it, were such, that he was obliged to be constantly handling the body of the sufferer ; and could not with safety leave his bedside, during the height of the attack.—It might even be said, that in every case the patient and he breathed upon one another : So that, had the effluvium exhaled from the lungs or skin of the patient, been truly infectious, even in the slightest degree, he could have had no chance of escaping.—Next he saw, that where one member of a family was ill, the others were not more liable to get the disease, than an equal number of individuals picked out from the general body of the community.—This must be taken with some allowance.—Sometimes two or more mem-

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\* This is a very striking fact. From a medical list, consisting of between two hundred and fifty and three hundred individuals, most of whom saw the disease largely, only three persons were attacked, and one death only occurred.—The fatal case took place at Barrackpore, a station very little visited by the Epidemic; the two others, which were not severe, occurred in the Centre Division of the Army. There too, one of the Surgeons of His Majesty's Corps was cut off ; the only Medical Officer belonging to the King's service known to have been affected.—In Nagpore the Medical Staff remained for several days, night and day in the hospitals, and yet all escaped.

bers of one family were seized; but in such cases, they were generally all taken ill together; were living in the same unwholesome situation; and had been previously exposed to some manifestly strong exciting cause: as the eating of noxious food; sudden vicissitudes of temperature; and the like.—In the rare instances, in which one fell ill at some distance of time after another, if we do not chuse to consider the concurrence as purely accidental, we shall be at no difficulty to explain it, upon remembering the depressing influence of fatigue, fear, sympathy, and grief—all powerful predisposing causes.\*

In camps, where the general body was more compact, and the sick more numerous, and crowded in smaller space, there was still ampler opportunity of confirming the truth of these observations. In no one instance were the dooley

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\* A very striking example of the noncommunicability of the disease by contact was afforded in Colonel Gardner's Irregular Horse, which was attacked at Khassgunj in the Doab in August 1818. No two men were seized in the same hut, although from twenty to thirty troopers slept in each. A case exactly the opposite of this occurred in Lord Hastings' camp at Gorruckspore. A Sepoy died of the Pestilence. Five of the Corps, who had shown no signs of illness, were employed to carry the body to the grave. They were all seized with the disorder during the ensuing night; and all died: This no doubt looks very suspicious; but then we know nothing of the concomitant

bearers, native compounders, or any other part of the large hospital establishments then necessarily kept up,—although all were often so hard worked as to be scarcely able to stand from fatigue—more sickly than other descriptions of followers; nor did the soldiers, who constantly flocked to the hospitals, to see and watch over their sick comrades, appear, by that means, to be more susceptible than others, of the disease.—Nor were those patients, who were ill of other disorders, although always surrounded by persons in every stage of Cholera, therefore more liable to be attacked; unless perhaps an exception be made in favor of convalescents: a class of persons always, from debility, much predisposed to fall into fresh disease. In the Centre Division of the Army all this was particularly remarked; and during the week in which the Epidemick raged with so much fury; when the camp was a sick ward, and every tent was filled, or surrounded with the dead and dying; the Officers suffered comparatively very little. From a number that could hardly have fallen short of three hundred, only five or six deaths occurred. And it should be remembered, that at this time Officers of all descriptions were equally exposed with the Medical men; for the sick had become so numerous, that even the services of all were circumstances; which as in other instances of apparently, dubious origin, might have been sufficient to do away every suspicion of the agency of Contagion.

is insufficient, to tend them with proper care, and duly administer the requisite remedies.

Let us now see, if these results deduced from general experience of the habits of the disease on a large scale, are strengthened by any such body of individual facts, as contraindicate the infectious nature of the poison. Here our only difficulty will be to choose the strongest, amongst a large number of instances bearing upon the point. To begin with the different Divisions of the Army.

From the Centre Division, a few days previously to the breaking out of the Epidemick, a small force, consisting of 4 troops of the 7th Regiment Native Cavalry, 3 Light Companies of Sepoys, and the Dromedary Corps, was detached on particular service in the neighbourhood. A short time afterwards, the remaining squadron of the Corps of Cavalry was sent as a reinforcement, from the great camp, in which the disease had then got head. It carried the virus along with it; and actually lost several men, after its junction with the foregoing detachment; which nevertheless remained perfectly healthy throughout.

But, there is yet a still stronger instance of the possibility of a diseased body joining a healthy one, without thereby communicating the infection to it. On the morning of the 11th of May 1818,

a detachment of 90 men of the 1st Battalion 26th Native Infantry marched from an inferior post, to join the main body of troops then encamped at Saugor. After an ordinary march, it halted in perfect health, half way ; under shelter of a few trees on the banks of a small lake ; situated in the midst of an open space, about three miles in circuit, and surrounded by low, woody hills. The whole remained well until the fall of night ; when Cholera broke out amongst them. The first man was taken ill at midnight, and died in half an hour. Several others fell sick within the next few hours ; and before sunrise, twenty out of the ninety were overtaken by the disease. Although the Saugor camp was distant only five or six miles, the detachment was too weak to move without assistance. The sick of the Sepoys and followers were therefore carried in, in carts and doolies sent from the main body ; but before 11 A. M. when they got to their ground, five were already dead, and two others moribund. Next morning, a man of the same party was seized in the act of scouring his accoutrements ; immediately became insensible ; and expired in a few minutes. During the three succeeding days, several others were taken ill ; and before the end of the week, of the whole Detachment, there was not a single man, but was sent to the hospital, labouring under Cholera, or other modifications of bowel complaints. The men of this party mixed promiscuously with

those of the Saugor Troops ; and yet of the latter not one individual got the disease.

An instance of the same kind occurred in the Hansi Division ; except that here the party, which escaped, went into the infected medium, instead of the pestilence being carried amongst them. When the disease was at the worst with the troops composing this Force, Casement's corps of Irregular Horse entered the camp, and continued with the Division during the remainder of the service ; yet it did not, at all suffer.

It may be supposed, that in these cases, the persons who escaped, owed their immunity to their not having been long enough exposed to the poisonous matter ; or to some incidental peculiarity in their condition, for the time-being. But, then, we shall find, that the same irregularity obtained, where those remaining unaffected were for a long period surrounded by the supposed infectious atmosphere ; and in all respects similarly situated with others, who suffered severely. Of the latter, a remarkable example was afforded in the Left Division of the Army, whilst under the influence of the disease. Here the 7th Regiment of Cavalry, and the 2d Battalion 13th Regiment of Native Infantry remained entirely exempt ;\* and the 2nd Battalion

\* It is true, this and other instances to be cited, may be in some measure accounted for, by the Corps having earned exemption by previous exposure to the influ-

1st Regiment had only three mild cases; while the 1st Battalion 14th, and the 2nd Battalion 28th Regiments were greatly affected. The same partiality of affection here took place among different classes and descriptions of troops.—The Goolundaz, gun lascars, and miners were mildly affected; while the pioneers, drivers, &c. who had undergone the same vicissitudes of weather, and fatigue, were not at all touched.—Some corps lost more than a hundred, others only three or four men. This could not arise from separation, or difference of situation and diet; for all used the same food; and there was constant intercourse, and daily change of ground.—The same observation may be extended to the Rajpootana Force, of which the right suffered more than the left portion.—In Furruckabad Lines, the Jail and the Artillery Barracks, the former containing six or seven hundred prisoners, subject to great privations, and daily worked in the sun upon the roads, and the latter inhabited by 100 Europeans and 250 Natives of the 12-pounder Experimental Brigade, had not a single case; whilst the Levy Corps suffered severely. The case of the Native Artillery Lines at Allahabad, which escaped, although in the very centre of the pestilence, has been already alluded to.—But at this station, there was something yet more to our pur-  
ence of the disease; whilst forming part of Colonel Philpot's Detachment from the Centre Division.

pose. For of 400 Supernumerary Invalids; assembled there for examination by the annual Invaliding Committee, not a man was affected; although they were living, under perfect similarity of circumstances, in the Lines of the Regular Invalid Battalion, the men of which, in fourteen days had 50, of 680 their total number, sick of the disease.—So, while the disease raged virulently at Banda, not a man belonging to the 2nd Battalion 3d Native Infantry stationed there was affected.—At Hutta, again, a healthy town on the banks of the Sonar in Bundelkund, the Epidemick committed such ravages, that the inhabitants fled, and took refuge in the neighbouring villages; and so virulent was the poison, that three Sepoys and seven camp followers of the 2nd Battalion 1st Regiment were seized, merely on that Corps marching through the place.—And yet, the disease never appeared amongst a Company of Sepoys, or their followers, then in the fort, which was divided from the town only by a broad street.—What here served to screen these men from infection? Certainly no suspension of intercourse between the town and fort; for this always remained free; much less superior salubrity of situation, for the fort was small, and crowded with buildings, and the town high, and open.—Thus too, whilst the disease raged in Saugor, and in the lines of the 1st Battalion 26th Native Infantry about a mile and a half distant; not a case occurred in

the fort in the centre of the town, which was then garrisoned by 200 men of the 2nd Battalion 1st Regiment.—In like manner, in Kotah, three Companies stationed in the fort escaped entirely; whilst one hundred persons were daily perishing in the town.—And at Muhed-pore, when the Epidemick prevailed in the vicinity, and was daily attacking a detachment of Bengal troops, consisting of part of the 1st Battalion 6th Regiment Native Infantry, two *Rissatus* of Skinner's Horse, and 1500 Camp followers, it entirely spared a body of 500 of Holkar's Reformed Horse; although the two camps closely adjoined, and a man, who had been sent in from the Bengal Division after getting the disease, went through every period of it amongst the healthy Mahrattas. If the virus were capable of being procreated by Contagion, surely the poisonous particles emanating from the body of this infected person, would have been sufficient to support and diffuse it all around.—For, this body, having an infected person in the midst of it, was, except in respect of numbers, then in the precise situation of the larger Divisions of the Army; in which the disease always began with one or two unconnected cases; slowly, and gradually creeping on to inveteracy.—With it, all that was wanting, was the peculiar disposition to take on, and keep up the diseased action; and this being absent, the supply of vitiated matter, which, in small pox

and other distempers, confessedly contagious, would have sufficed for its continuance, proved quite innoxious.

We should fall into endless repetition, if we went on citing the great variety of evidence, which might be drawn in support of the doctrine of non-contagion, from the general progress of the disease, through the districts and towns successively visited by it.\* Let the reader only call to mind the innumerable detached spots, which remained free, wherif all around was sickly ; and remember, that in no single case, was any restraint placed, on free intercourse between the healthy and diseased ; and he must come to the conclusion, that the Epidemick was totally independent of the common laws of Contagion.

But, as it cannot be denied, that there were some circumstances in the manner in which the disease arose both with the Hansi and Centre Divisions, militating against this opinion, let us, before leaving this part of the subject, examine them a little more narrowly.

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\* One case is too remarkable to be passed over. Of the cluster of islands lying near the main land, as the Ganges discharges itself into the Bay of Bengal, Sundeep, a large and populous place, remained quite free ; whilst those of Deccan Shahbazpore, Hattiah, and Bonney were ravaged. There was nevertheless constant and great intercourse between all.

The persuasion of all the Medical Staff present with the Hansi Force, regarding the mode in which it received the infection, has been already quoted. It consisted in the belief, that it was communicated by the Meerut Detachment, who got it on passing through Delhi, at the time of their crossing the Jumna.—The opinion of so many intelligent persons, is no doubt entitled to much respect; and would entirely set the question of Contagion, in that sense of the word in which by infection is meant the communication of the disease from one large body to another large body, at rest; were it not counterbalanced by some circumstances of an opposite tendency.—If we believe, as stated by one gentleman, that before the junction of this detachment, the disease had already found its way to several places intermediate between Delhi and Hansi, and Delhi and Kurnaul, we can be at no loss to account for its rise in Camp, without resorting to a belief in Contagion.—For, the Camp presented to the Epidemick exactly that face of things, which we know to have been always particularly affected by it; namely a large body of men collected within a narrow space.—We are accordingly told, that previously to the junction of the Meerut Detachment, one or two cases had actually occurred amongst the Camp followers.—Admitting this to have been the case, the certain consequence of the great additional stock of pesti-

lential matter imported from Delhi, would be to aggravate, and widely diffuse the disorder ; and the whole mischief might very naturally be placed to the account of the new comers, by persons unaware of its having begun to operate, though in a less degree, previously to their arrival.— However this might have been, there were no grounds for supposing, that, even here, the disease was communicable from person to person ; and the Medical Officers are unanimously of opinion, that it was certainly not so.

The case of the Centre Division is encompassed with still greater difficulties. The main body of this Division crossed the Jumna at Shergurh on the 28th October : and after one or two days halt, marched, in a North Westerly direction, towards Loharee, Nuddeeka-gaon, and Terayt.— A Detachment, composed of 5 Companies of the 2nd Battalion 13th Regiment Native Infantry, and two Companies of Pioneers, was left behind, in charge of the bridge of boats thrown over the Jumna.— It was here, that the Epidemick first shewed itself. A few cases appeared as early as the 2nd of November, in some troops then passing over ; but on the 5th, the disease became common in the Detachment on guard.— On the 9th, this Detachment joined the main body of the Army at Terayt ; and it is declared by some of the Medical Officers then on the spot, that during the two immediately subsequent days, the disorder was first

observed in Camp.—In support of the opinion, that this Detachment brought the disease into the previously healthy Division, it is added, that the 2nd Battalion of the 13th Regiment was brigaded to the left of the 1st Battalion 24th Regiment Native Infantry, and the 1st Battalion of the 24th to the left of the 2nd Battalion 11th Native Infantry ; and that the 24th was attacked before the 11th. Lastly, in further proof of the communicativeness of the virus, it is affirmed, that the previously healthy villages, and among other places the town of Sumpter, got the infection from the Division.—This is the amount of facts in favor of the disease being capable of transmission by a large body from an infected, to a distant salubrious atmosphere ; and thus communicable by contaminated, to healthy individuals.

It must be confessed, that this evidence is very strong, and would prove quite conclusive of the matter, were it to remain unshaken. But, unfortunately for the hypothesis meant to be established by it, there is hardly one item of it, that is not opposed by circumstances of a contrary tendency.—And, first with regard to the appearance of the disease in the main body of the Division, the testimony of different individuals, is so much at variance, as to be quite irreconcilable.— Of twelve Medical Officers, who have given replies to the queries on this point, one states the disorder to have broken out on the 6th ; two on

the 7th ; one on the 8th ; two on the 9th ; one on the 10th ; four on the 11th ; and one on the 12th. This discrepancy, however great, is easily explicable, when the insidious nature of the disease at its first onset is taken into account ; and when it is recollectcd, that the sphere of each individual's observation, would hardly go beyond the Battalion immediately under his charge.—But, how are we to reconcile the assertion of its having appeared on the 6th, 7th, 8th, or even the 9th, with the assumed hypothesis of infection from the Shergurh Detachment ?\*

In like manner, the fact of the Division communicating the virus to the villages lying on its route from Terayt to the Betwah, is equally disputed.—It is held by some, that those villages were not at all affected ; by others, that they had the disease independently of any intercourse with the Division ; and by a third party, that the latter invariably carried the infection along with it.—One gentleman, having several times sent his Na-

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\* We are assured by a gentleman, not of the medical profession, but perfectly capable of ascertaining the fact, that the disease was brought into Camp at Terayt on the 6th by the Raja of Sumpter's troops, who came in for the purpose of being reviewed, and took post in the rear of the 25th Regiment Native Infantry.—And it was reported to the Commander in Chief, that in the town of that name ravages had been committed by it, six weeks before the Army crossed the Jumna.

tive assistants into the district, was uniformly told, that the pestilence was not amongst them.\* Another declares, that all the neighbourhood was sickly : the dry and clean town of Sumpter, equally with the low and filthy village of Nuddeegaon. A third, that the Army having on the 13th marched from Terayt to Talgong, the inhabitants of the latter place got the disease the following morning ; and a fourth, that Sileia was first affected, on being entered by the Division on the 19th.

Under such extreme contrariety of testimony, it would be vain to attempt drawing any certain conclusion.—This much, however, may be affirmed, from a review of the whole progress of the Epidemick in this quarter, that the infectious medium, in whatever it consisted, was confined within a very circumscribed circle ; and was very slowly extended to healthy parts of the atmosphere.—If, setting aside the circumstances militating against it, we take it for granted, that the infection was truly received by the Centre and Hansi Divisions from the Detachments above mentioned, we must believe, that the disorder, although not communicable by con-

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\* Col. Philpot's official reports state positively, that the thinly scattered villages on the route of his march remained unaffected ; while his Detachment was suffering very severely.

tact from person to person, was so from one large body to another large body ; and that, wherever the poison got head amongst a number of men, it assumed some new quality, so as, when mixed with the atmosphere, to become infectious.— What constituted this additional quality, we cannot pretend to determine ; but, in support of its existence, we may quote the predilection of the Epidemick for cities and camps ; the infection of the Left Division and the Nagpore, and Meerut Troops, immediately after entering into the diseased medium at Jubbulpore;.. Nagpore, and Delhi ; and the similar case of the troops, and followers in attendance upon the Governor General, being attacked shortly after communicating with an infected village, in the Gorruckpore District.— To the same account may be placed, the progressive march of the disorder from one part of an infected place to another ; as in the Centre and Hansi Divisions ; and more particularly, the Rajpootana Force, in which the virus seemed to be regularly propagated from Corps to Corps.\*— In some instances,

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\* The line of this Force faced nearly North and by East. The troops were arranged in the following order, commencing from the left. The 1st Battalion 28th Native Infantry ; 6th and 7th Companies Pioneers ; Goolundaz and Gun Lascars ; the Park in the Centre ; 5 Companies 1st Battalion European Artillery ; 1st Battalion 27th Native Infantry ; Squadron 2nd Regiment Cavalry ; 2d Local Cavalry ; in the rear of the park

the suffering body would appear to have sickened immediately upon coming into the poisonous medium; as was the case with the Nagpore Troops, who were affected on the very day in which they encamped at the infected village of Gaongong.—But, more frequently, one or two days would seem to have been requisite to bring the virus into action.—Thus the Meerut Detachment entered Delhi on the 29th, and was not affected till the 31st; thus too, the Hansi troops had not the disease till the 6th, the day after the junction of that Detachment.—Again, by those abetting the opinion of the disorder being communicated to the Centre Division by the Shergur Detachment, it is stated, that the first cases occurred on the 11th, two days after its junction. Lastly, the followers of the troops in personal attendance upon the Governor General in April, first suffered on

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were 415 Ordnance Drivers, with lines of Officers' tents intervening. The 1st Battalion 28th and Goolundas were attacked on the 14th September; on the 15th a few cases occurred amongst the Pioneers and Lascars; but among them and the Gunner Drivers they were not numerous till the 19th. On the 18th the squadron of Cavalry was attacked; and on the 20th, the Local Cavalry, and 1st Battalion 27th N. I. It must, however, be remembered, that the ground was drier on the right, than on the left of the line. .

the 23d, three days after encamping near an infected village.\*

\* The disease recently appeared in a Detachment of the Rajpootana Force under such circumstances, as at first seemed to warrant a suspicion of the existence of Contagion. A Detachment consisting of a troop of the 3d Regiment of Cavalry, two Companies of the 1st Battalion 1st Regiment, and one Company of the 1st Battalion 6th Regiment Natiye Infantry, left Colonel Ludlow's Camp in March for Indore, to meet the Escort of Chimnajee Appa. In this Escort were four *Risalus* of Skinner's Horse; which had come from General Smith's camp, South of the Nerburda; and from the time of their leaving it, had been affected with Cholera. On the 22d of March, the disease appeared in the Detachment, then at Oujein; and between that day and the 27th, when from the judicious means of separation and constant moving resorted to, it disappeared, forty cases, 37 in the 1st, and 9 in the 6th Regiment, occurred: of which 8 of the former, and 3 of the latter proved fatal. There were likewise seven deaths among the Camp followers. No case occurred in the troop of Cavalry. Whilst this Detachment was performing quarantine at a distance of twelve miles, a similar force sent to take its duty was not affected in March; although Skinner's Horse and the Mahrattas marching only a few miles in their rear, were daily losing men. It would appear, but at what precise time is not mentioned, that the disorder during the following month attacked the main body of Colonel Ludlow's Force stationed at Onail, about twenty miles distant from Oujein. The second Detachment with Chimnajee, had apparently become affected previously to this; and like the former had been secluded During April six

fresh cases were admitted into hospital from the 1st Battalion 1st Regiment ; of which one only was fatal ; of 20 bearers and workmen 4 died. Of the 6th Regiment, 19 Sepoys were seized, and seven died. In the 8d Cavalry the disorder was slight, and only two grooms died. When the disease got into the lines at Onail, the first person seized was a blacksmith, who died in a few hours. The brother of this man was attacked whilst bathing, after burying the corpse; and next morning a third inmate of the same tent; but not an individual in the tent of the 1st Grenadier company 1st Regiment, which was only six yards distant, was seized from first to last. A case nearly similar occurred in the 6th Regiment. A Sepoy died of the disease. A Naick who had been sitting up with him, was attacked as they were closing his grave, and likewise died. But, not a single patient in hospital, nor any of the attendants, who slept close to the sick, breathed the same air, and were constantly lifting them up and laying them down, and rubbing their bodies with oil, were attacked. This is the sum total of the proof in favor of the contagious nature of the disease in this quarter. But in fact it amounts to nothing. Unfortunately we have no particulars regarding the seizure of the blacksmith's brother and companion ; but is it not more likely that their illness was ascribable, as in innumerable other well ascertained instances, to the depressing influence of fatigue, grief, and the other usual predisposing causes, than to infection ? How was it with the Naick ? His case is at first sight equally suspicious ; but fortunately we know more of its concomitant circumstances. He had attended the Sepoy his friend during his illness, and wailed over him when dead ; and after a night of sorrow, when exhausted by fatigue, mental anxiety, and

fasting, he followed his corpse to the grave, to a considerable distance, in the heat of the forenoon. But this is not all; for it appears that, when heated by several hours exposure to the midday sun, he incautiously drank a large quantity of cold water, and was immediately taken ill. So that in his case, we have all that constitutes the essence of the predisposing and exciting causes of the disease. It may be said, that the benefits derived by this Division from segregation proved the contagious nature of the Epidemick; but in other quarters change of ground and scene had invariably the same good effects, without the aid of separation. The appearance of sickness was here preceded by exactly the same atmospherical phenomena, as in almost every other part of India. Easterly winds; very hot days; and great variations of temperature between the day and night. The probability is that the whole atmosphere in that quarter soon became corrupt; for a Detachment of the 2d Battalion 5th Regiment Native Infantry and of the 1st Corps Local Cavalry at the same time got the disease, and lost thirteen men, when encamped on the banks of the Miah River, where no mode of conveyance of the virus could be traced. But there too the days were very sultry and the nights chilly; and the men had been indulging in eating unripe mangoes. No case of recurrence of the disease appeared in any of these Detachments. Most benefit was derived from the free use of *Spiritus Ammonis Compositus*, in doses of 70 and 100 drops.

## SECTION VII.

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### OF THE PREDISPOSING AND EXCITING CAUSES OF THE EPIDEMICK.

ON these points, so much has been already said, whilst other branches of our enquiry were under discussion; that they cannot now be largely entered into, without the frequent repetition of many things previously mentioned, and yet fresh in the reader's memory.—But, as they are of sufficient importance, to require being treated of by themselves, in a Report professing to contain the results of general experience, we shall now proceed to notice them as cursorily as possible; endeavouring to avoid the introduction of all unimportant facts.—In so doing, we need not be very anxious about the separation of the Predisposing and Exciting Causes; for these two classes so much run into, and take the place of each other, under different circumstances, that what in one case is a predisponent, in another acts simply as an exciting cause.—Thus, exposure to the heat of the sun, which was in all cases observed to be a powerful exciting cause, would, when long continued, or renewed du-

ring many successive days, become a predisposing cause, by inducing fatigue or debility.—So, in many other instances, the two classes were mutually convertible.

Of the causes strictly Predisposing, debility, in whatever way induced, was by far the most powerful, and most generally present.—To its operation, we are chiefly to ascribe the fact so universally observed, that the lower classes—those badly fed, and ill cloathed, and lodged,—suffered more than persons in better circumstances of life. This was particularly remarkable in the different Divisions of the Army visited by the disease.—Thus in all of them, the Hindoo, who lives chiefly on poor, crude, and ascendent vegetables; and is in all respects both of diet and cloathing sparing of expence; was more liable to be attacked, than the Mussulman, who eats flesh meats; sometimes uses spirituous liquors; and is generally warmly dressed, and comfortably lodged.—For like reasons, the European Soldier was less subject, than either class of the Native troops; and the European Officer, again, less so than the Soldier.—How much this depended on the possession of greater bodily strength and power of resisting disease, was demonstrated in the case of the European Flank Battalion, the men of which had been previously debilitated by attacks of the Epidemick fever at Allahabad, during the foregoing

ing year. This Battalion suffered, accordingly, more than any other with the Centre Division. Of 800 officers and men, it had at one time 200 in Hospital; and it buried its Surgeon and 54 men.—In like manner, convalescents, whose constitutions had been weakened by previous disease, suffered proportionably more, than persons of sound frame.—Many were taken ill, whilst under the influence of mercury, used for the cure of fever, hepatitis, and lues.—Thus too, persons of sober, regular habits, enjoyed greater immunity, than the drunken and dissipated; who kept irregular hours, and were frequently exposed to the vapours and cold of the night, after a debauch,

The second great Predisposing Cause was fatigue, accompanied with, and aggravated by exposure to the sun by day, and cold by night. Thus in Calcutta, it was remarked, that the men working in the open Dock Yards were far more frequently taken ill, than persons of nearly the same descriptions employed under shelter in the Cotton Screws. In respect of diet and mode of life, the advantage was undoubtedly in favour of the former, who are generally mechanics on high wages, whilst the latter are common *Coolies*, or day labourers of the poorest order.—For the same reason, fishermen, boatmen, husbandmen, gardeners, travellers, bearers, washerinen, and

prisoners working on the roads, suffered dreadfully.

The ill effects of fatigue were particularly striking in the case of the Left Division of the Army.—All classes of this Division, for many days previously to the breaking out of the Epidemick, had undergone great exertion, in the sun by day, and in the cold of the night, whilst conducting a heavy train, through a difficult country, to Mundela; and accordingly suffered severely.—The 2nd Battalion 28th Regiment, which lost more men than any other corps, had been left in the rear to conduct the store carriages, and had necessarily gone through greater fatigue and exposure, than the main body.

In the Centre Division, again, more individuals were taken ill during the night, than in the day; and more, previously to moving from their ground in the morning, when the troops were constrained to stand long in the cold heavy dew, and at the termination of a long fatiguing march, than at any other period of the twenty-four hours.—Thus too, persons on picquets and night guards were almost certainly attacked; and the succession of seizures was so quick, that it was more than once necessary to relieve the sentries three times, during the two hours, which it is customary for them to stand guard.—This was especially the case with the artillery, of which

scarcely a man on guard during the night escaped; and of the whole number seized, two thirds were taken ill between sunset and sunrise. Here too, the different degrees of susceptibility amongst different descriptions of persons were very remarkable.—The bearer, and *Khulassee* generally; and with the Artillery, the Drivers and men of the Magazine Establishment; were attacked in much larger proportion, than the regular Soldiers; because they were inferior in strength to the Sepoys, and Goolundaz; had no tents; received less pay; and were worse clad and fed.

In Agra, and other Cities of Upper India, where it is the custom of the Natives of all classes to sleep on the tops of their flat roofed houses, during the great heats of summer; the effect of exposure to the cold and dew was particularly exemplified: for the greater number seized were persons so situated; and few escaped of such, as having heated themselves during the day, lay out during the night, with little or no covering. On the other hand, almost all the gentlemen's servants, who took to wearing woollens on the change of weather, continued in good health. A like circumstance was also marked in the Centre Division; but there it was confined to the establishments of one or two Officers. Lastly, long fasting, by disordering the functions of the stomach, and paving the way to indigestion, was a frequent precursor and cause of the disor-

der. Thus in the city of Delhi, where the Epidemic happened to prevail during the great annual fast of the *Ramzan*, in which it is unlawful for Mahometans to eat, while the sun is above the horizon, a much larger proportion of persons of that persuasion suffered, than of the Hindoos, who were not similarly restricted as to the times of their meals.\*

It was observed, that individuals daily performing a moderate portion of work, especially if under shelter, were far more exempt, than those who were alternately idle, and fatigued by heavy labour. Thus the persons employed in the Silk Filatures in different parts of Bengal, who are engaged from morning to evening in tasks of a light nature, suffered very little; whilst *coolees*, and all classes casually bearing burdens, or going long journeys, were frequent victims. The reason might be, that the bodies of the former were kept in good condition, by a stated quantity of labour; whilst the latter were at one time exhausted by over exertion, and at another lay indolently asleep on the cold, damp ground.

If we were to look for an Epitome of all that composes the Exciting Causes of Cholera, we

\* The greater prevalence of the disease generally, in the month of Ramzan, is remarked by Avicenna, whose experience in the East gave him full opportunity of observing the fact.

need only refer to the appearances presented in the Chittagong District, during the Hot Season of every succeeding year. This district is formed by a narrow belt of land, extending about two hundred miles from North to South ; bounded by the sea to the West ; and by lofty ranges of mountains to the East and North East. The surface of this tract is irregular, and interspersed with low hills, and rising grounds ; covered with brushwood, bamboos, and forest trees. The intervening flats are highly cultivated ; and rice being the chief produce, are quite dry during the Hot Season. The soil is light and sandy ; and there are no swamps or marshes throughout the district. From the month of March, as the Sun ascends, strong Southerly winds begin to prevail. The atmosphere then becomes moist and cloudy ; with great heats and occasional falls of rain during the day ; and nights calm and sultry during the early part, and cold, with a chilly air from the East, towards morning. The effect of these great diurnal vicissitudes upon the human body, is very striking. The moist wind from the sea, and the stagnating air of the evening, produce profuse sweats, relaxation, and great nervous irritability ; and thus render the frame, especially during sleep, extremely sensible to external impressions ; and fit it for the reception of disease. In this state, it is acted upon by the cold wind and dew of the morning ; a strong check is im-

mediately given to the previously violent perspirations ; the blood is driven towards the centre ; and that disturbance of the circulation, which we know to be one of the early attendants on Cholera, is thereby superinduced. This disease is accordingly endemic in the district during the Hot Weather of each year ; and does not subside until the air is cooled, and the atmospheric temperature becomes more even, after the setting in of the regular Rains.

We shall find, that causes of the same description, that is, great and sudden vicissitudes of the weather, from hot to cold, and from dry to moist, accompanied with changes in the direction of the winds, were almost uniformly in operation, wherever the late Epidemick shewed itself; and were generally the immediate precursors of its visits. It has been already seen, that in Calcutta, and other divisions of Bengal, its first rise was preceded by a long course of unusually humid and sultry weather ; and that its subsequent periods of increase and decline were always modified by changes in the weather. Thus in February 1818, and April 1819, the two most marked periods of its aggravation, the days were sultry, and the nights cold and raw ; with heavy storms from the South and East. So it was in almost every part of the Lower Provinces : in Jessoore, Burrisaul, Dacca, Sylhet, Chittagong, Nuddeea, Rajshahy, Bhaugulpore,

Monghyr : as well as in the valley of Khatman-doo, and in many other stations. At Patna, the weather had been very hot and dry some time before its appearance. At Buxar no rain had fallen for nearly a month ; the days were exceedingly oppressive ; and the nights chilly, with heavy dews.—At Allahabad, although no great changes occurred in the range of the thermometer during the night and day : the mercury generally fluctuating between 84 and 91 : the air was very sultry to the feel.—At Cawnpore again, the thermometer ranged from 72 to 112 during the whole of April and May, when the disease prevailed in the town ; and in Lord Hastings' camp in Gorruckpore, the mercury in tents stood at 80 at sunrise, and at 110 at noon. At Futtygur, the weather had been insufferably hot, and not a drop of rain had fallen for a month ; when a heavy Northwester occurred on the afternoon of the 9th of June, and next morning the Epidemick was first seen. So, in Agra, the morning and day of the 1st of July were exceedingly hot ; the thermometer stood at 96 in the shade ; and not a breath of air stirred. At 6 P. M. a gale of wind from the East suddenly came on ; the air at once grew damp and chilly ; and next morning many persons were carried off by the Epidemick. And during the whole period of its continuance, the days were very hot, and the nights cold and moist ; with a keen penetrating

wind ; the thermometer ranging from 84 to 94. But as the wind came round to the West, and the weather became steady, the disease withdrew. In Delhi, the rains had been very abundant, with Easterly wind, from the 20th June ; the whole country was covered with water ; and the atmosphere was loaded with moisture. At this time, not a case of the disease appeared. But, as soon as the wind veered round to the west, and brought with it a great change of weather ; sultry days and chilly nights, with the thermometer varying from 72 at sunrise to 96 at noon ; the mortality began ; and continued unabated, until a recurrence of Easterly wind, and an abundant fall of rain, drove away the disease. Thus, the city continued free so long as there was simple moisture, with moderate, equable temperature ; but became sickly the moment the westerly wind produced great evaporation, and alternations of heat and cold. At Meerut, the weather was perfectly seasonable, with frequent heavy falls of rain, during the three first weeks of July. But, from the 24th until the 29th, when the disease broke out, there was not a single shower ; the thermometer then fell four degrees below the monthly average ; and the nights became sensibly cooler, with heavy dews. Jeypore became affected immediately after the cessation of heavy rains ; and Saugor, and all the towns and posts in its vicinity, during the Hot Winds ; when the days

were very warm, and the nights so cold, that quilts and blankets were used. But, without fatiguing the reader with a vast number of instances, all in proof of the same fact, we shall now advert to the condition of the different divisions of the Army, with respect to climate when severally attacked: as very strongly evincing the unvarying connection of the Epidemick with marked vicissitudes in the atmospherical temperature, and an unsettled state of the weather.

With the Hansi Division, for some time before the appearance of the Epidemick, little, if any rain had fallen, and the heat was great: the thermometer generally standing at 96 at noon. The disorder, however, after having once begun, continued with the Troops during wet and variable weather; and then it was remarked, that such Corps as had brought their cloth pantaloons with them, as the 26th Regiment, suffered less, than those who had not, as the 29th Regiment.

The Epidemick appeared in the Centre Division in the beginning of November. Of October, the first eight days had been cloudy, with Easterly wind, occasional falls of rain, and the thermometer ranging from 79 to 90. From the 8th to the end of the month, with little variation, the wind was strong from the West, and hot; with clear sky, and sultry weather: the

mercury towards the latter part falling as low as 62 at sunrise, and keeping as high as 98 and 99 at noon, and from 84 to 96 at sunset. The same extraordinary fluctuations in the range of the thermometer were remarked during the early and middle parts of November : the mercury from the 1st to the 17th standing from 50 to 60 at 6 A. M. ; from 84 to 99 at noon , and from 63 to 90 at 6 P. M. ; the wind still keeping Westerly. About the 5th, the effects of these sudden transitions began to be more marked than before ; the days became insupportably oppressive ; and the nights extremely chilly, with heavy dews, and fogs in the mornings. From the 6th to the 12th, the period within which it is agreed by all, that the Camp was first affected by the pestilence, the thermometer was never higher than 51 at sunrise, nor lower than 84 at noon. On the 6th, it was 50 and 90 ; and on the 7th, 45 and 90. These it will be remembered were the days during which the earliest cases, in all probability, occurred. About the middle of the month, the difference of temperature between the day and night became less ; and the disease sensibly declined from the 17th ; and wholly withdrew towards the latter part: as the variations grew more equable ; and the weather became such as is usual during that period of the year.\*

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\* The reader will find Meteorological Tables for the months of September, October, November, and Decem-

It will be observed, that with this Division, moisture had nothing to do with the production of the disorder : unless, indeed, we suppose, that the dews and fogs here stood in the stead of rain ; abstracting the heat of the body by primary application, and subsequent evaporation. The sky was clear and serene, and throughout, light and dry. In like manner, the disease appeared in the Nagpore Subsidiary Force, and in all the towns and villages in its vicinity, when the weather was exceedingly hot and dry ; the thermometer ranging from 76 to 90 in the Officers, and 120 in the Soldiers' tents ; and wholly departed from the province, as the heavy rains, which fell in the middle of June, cooled the atmosphere. But, with this Force, probably, no exciting cause was necessary ; as it fell at once into a strongly impregnated pestilential medium ; and was overtaken by the disease without any previous preparation.

There were great vicissitudes of temperature with the Left Division during the early and middle parts of April, with daily storms of thunder and rain. The days were extremely hot ; the mornings and evenings foggy ; and the nights so cold, that blankets were required : the ther-

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ber, with this Division, annexed to the introductory discourse on the Weather.

mometer ranging from 45 to 78 at day break, to 86—103 at noon.

When the disorder broke out in the Rajpootana Force, a different state of weather prevailed. From the 1st to the 14th September, there was only one day's intermission of rain; and the atmosphere was exceedingly cold and damp. There was continual small rain during the whole of the 13th, the day preceding that on which the disease broke out; and the air was very raw and chilly. On the 21st the rains began to cease; and with them the Epidemick.

We shall only mention two other instances, in which the pernicious effects of cold and moisture were especially remarkable. From the 9th to the 15th August, the 2d Bn. 19th Regiment, then encamped on low ground, under damaged tents, in very rainy weather, at Mundessore, was severely visited by the disorder. Of thirteen sepoys taken ill, six died. After a few days, the Battalion moved to a higher spot; and although one man was taken ill during the march, not a case occurred after it reached its new ground. So, with the 1st Battalion 6th Regiment in Malwa. This Corps, with a large body of Camp followers, on the 4th of May encamped on the high banks of a dry river bed at Jhanoor, three marches south of Ougein. The day was excessively hot. At 5 P. M. heavy rain came on; and

the thermometer, from being at 100, fell suddenly to 80. The disease, which was not then in the neighbourhood, attacked the detachment next morning.

It appears then, from the foregoing examples, that the principal exciting causes of the disease may be enumerated in the following order, according to their degrees of priority, and frequency of operation. 1stly. Alternations of heat and cold, combined with rain, or a very humid state of the atmosphere. 2dly. Simple alternations of heat and cold, without moisture. 3dly. Excessive heat, without cold or moisture.

We have yet spoken of these causes, only as they seemed to affect the health of large bodies, or of many persons at once. There was still another set of agents, confined in their operations to single individuals; and the effects of which, following instantly upon their application, could be immediately, and distinctly traced. Of this sort were the drinking of large draughts of good, or bad water, when the body was heated; gorging after long fasting; eating food of a deleterious quality; going suddenly from a hot, into a cold atmosphere; lying exposed to the wind when the cuticular pores were open, and the perspiration was flowing freely. In every part of the country, nothing was more common, than to see a person attacked by the disease, immediately on

drinking a large quantity of water, after a long walk, or exposure to the sun. But in the Camp of the Centre Division, where the water was foul, scarce, and only procurable at considerable distances; and the Sepoys and followers drank greedily from every muddy puddle on their march; hundreds were affected in this manner. So, in the Nagpore Force, where the heat and thirst of the men were excessive, the most fatal cases were brought up from the beds of the rivulets, in which the Sepoys had dropt, during the line of march. The mischievous consequences of eating bad, raw, and indigestible food were equally remarkable. It would appear, that during the year, in which the Epidemick arose, much bad rice had been grown in Bengal; and there seems no reason to doubt, that grain of this noxious description, when taken into the stomach of a person predisposed to the disease, frequently induced the attack. There was, at the same time, great scarcity in all parts of the Upper Provinces. All kinds of grain were very dear; and the lower classes of the inhabitants, being able to purchase only the poor and unwholesome sorts, often fell victims after swallowing an innutritious and indigestible meal. Thus at Futtigur, many persons were seized immediately after eating water melons; \* and at Agra the too free use of that fruit,

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\* The tendency of melons and almonds to induce the disease is marked by Avicenna; and Galen says, "the whole race of pumpkins, being of a cold and moist na-

of which the dry bed of the Jumna was then full, is mentioned as one of the leading causes of the disorder. Thus too, the eating of *Bajru* (*Holcus Indicus*), *Joar* (*Holcus Sorgum*), and other kinds of raw unripe grain, plucked by the troops in the field on their line of march, was in the Left Division, believed to have increased the number of the sick; and in the Centre Division, before the true nature of the pestilence came to be understood, was considered as the sole cause of the mischief, and strictly prohibited throughout camp.

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ture, when taken into the body produce a vicious humour, and render it especially obnoxious to Cholera Morbus."

## SECTION VIII.

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### OF THE MORTALITY CAUSED BY THE DISEASE.

THE data in our possession, are not sufficiently numerous or accurate, to enable us to form a correct statement, or even a plausible conjecture, of the number of persons, who have perished by the Epidemick. Several circumstances have concurred to diminish the value, and to circumscribe the extent, of the facts amassed on this point. The vast tracts of country, over which the disease ranged ; and the scanty and scattered state of the European settlers, who alone are capable of collecting the requisite information ; would, under every circumstance, have rendered it impossible, that complete returns should be obtained. Many places distant from the larger stations, and of limited population, would probably escape observation ; and, of those introduced into the returns, the loss would be either exaggerated, or lowered, according to the laziness, caprice, or interested motives, of the Native reporters. The inconveniences apprehended from trusting the requisite enquiry to the Native Police Officers, were, indeed, so great, that, upon application

being made in the proper quarter, it was thought right to discourage the attempt. The grounds, upon which this determination was taken, were, that the power necessary to be given to the *Thannadars*, and other persons of the same class, in order to enable them to form the desired census, could not be delegated, without their immediately making a handle of it, to oppress the Natives under their jurisdiction ; and that the results of the enquiry, as dictated by carelessness, interest, or fancy, would run far wide of the truth. Besides, that the Native population have always shewn a rooted aversion to having their numbers reckoned ; from a painful recollection, that under their former rulers, expedients of this sort were never resorted to, without leading to the imposition of capitation taxes, and other heavy burdens.

Notwithstanding these obstacles, lists of the total number of deaths, purporting to have been carefully made out by the police officers, under the directions of the Magistrates, have been obtained from several districts. But, even these come in a very questionable shape.—They appear to have been mostly taken at a late period of the disorder ; when the mortality occurring during the early part of its progress, could only have been guessed from indistinct recollection. Another suspicious circumstance is, that the deaths are generally stated in round numbers, of thousands,

and tens of thousands; partly for the sake of producing greater effect, and partly from an indistinctness, and propensity to exaggeration, common to the Natives of India with all other Asiatic nations.—From which it may be suspected, that the aggregate was not made up from a number of subordinate lists, but roundly put down at random. Another source of inaccuracy is, that, when the Epidemick was at its height, it was the fashion to lay every death to its account; so that every person, who was cut off suddenly, or in an unusual manner, was said to have died of Cholera.

Having premised these observations, we shall proceed to lay our scanty materials before the reader.—To commence with Calcutta.—The only accounts we have been able to obtain, of persons taken ill in the city and suburbs, are those containing the lists of individuals attended by the Native Physicians, at that time appointed by Government all over the country, to administer medicines to the sick. Even these are imperfect. For in the city, they embrace a period of three months and eleven days only; whereas in the suburbs, they extend from the 19th of September 1817, to the 25th of July of the following year: when the establishments were finally discharged, as being deemed no longer necessary. It appears then, that from the 19th September to the 31st December, of 18,920 persons, who in Calcut-

ta applied for aid, 9593 were discharged cured ; 3395 remained on the convalescent list ; and 930, or rather more than one in ten, died.—In the suburbs, again, comprehending a circuit of five or six miles diameter round the boundary ditch of the city, of 21,876, to whom relief was afforded between September and August, 20,878 were saved; 1578 died, or nearly a 16th; and 259 remained convalescent at the end of the period. Amongst these the mortality was greater at one time than another ; being from September to February as one in 14 ; and from February to August as one in 13. Of those affected, the proportion of males to females was reckoned as four to one ; probably from difference of exposure ; that of Children, and infants at the breast, a mere fraction.\* It must not be imagined, that these lists afford any thing like a fair index of the general mortality at the Presidency. Both there, and in other quarters of the country, thousands were prevented from applying for aid, from the rapidity of the attack ; from distance ; from aversion to European medicines ; and from a superstitious desire to

\* These tables are printed at the end of the work, and to them has been added another, exhibiting the number of deaths by the disease, reported to the Police, from January, 1815, to November, 1819, inclusive. The latter is chiefly useful, as enabling the reader to judge of the comparative mortality at different periods of the Epidemic. According to this criterion, September, 1817, February, March, April, May, and November, 1818, and November,

await the termination of the disorder in the vicinity of some sacred spot.—The mortality was undoubtedly very great; but it would be vain to hazard a conjecture of its amount. Of every second or third family, large and small, perhaps one, two, or three, and in some cases, five or six members perished. For many months numerous parties were constantly met carrying the biers of the dead; and the banks of the river were crowded with Hindoos burning the bodies of departed relatives.

In Jessore 10,000 persons were said to have been cut off in two months after the first appearance of the disease; and as it has ever since been fatally prevalent in that district, a vast addition must since have been made to that number.—In Bakergunge, of those who were attacked in the earlier months, scarcely any recovered without medicine; and the mortality was accordingly great.—The proportion of deaths was, however, less considerable, where medical aid was duly applied. Thus of 82 prisoners seized, only 12 died.—In Mymensing, where the disease has raged for two years, the deaths, according to the Police lists amounted to 10,714; according to the belief of the Medical Officer, to much more.—In 1817, they occurred chiefly among the lower classes; in 1818, neither cast, age, nor sex was spared;

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1819, have been the most unhealthy months; and February 1818, the most fatal of all.

and in September, October and November, the mortality was frightful. At Bulloah, and in the whole of the South West Division of Tipperah, few survived without medicine; and it is estimated, that a tenth part of the whole population disappeared.

In the Dacca district, we have some precise statements to go upon. From August, 1817, to January, 1819, of 6354 persons reported to have been attacked in the district, 3,757, or more than one half, perished. In the city again, where assistance was promptly given, of 1,081 taken ill before the end of the first year, 72 only died, and of 1,124 in the succeeding year, only 101, or scarcely one in a hundred. The houses in the town and suburbs amount to 20,000; and as in many, five or six individuals were affected, it is estimated, that we should be near the truth, if we were to allot one case to each dwelling.— The disease was most destructive in the commencement. Males were liable in a double proportion to women; and with them, the attack was more certainly fatal.

In the district of Sylhet, the deaths, according to the *Thannadar's* reports, came within a few of 10,000. The return of the *Sudr Thapna* (Sylhet town,) in which the houses were numbered, for facilitating the assessment of the *Choukeedaree* tax; and the deaths more accurately ascertain-

ed; might be better depended upon than the rest; and was to the following purport. Houses 3916; deaths from August, 1817, to January 1818, 1197. Supposing this to be correct, and allowing six persons to each house, there would be a population of 18,896, from which the mortality would be as one to seventeen.—Throughout the district, the average of those attacked, is assumed as one in eight; and of deaths as one in twenty-nine.—The mortality was greatest in the autumn of 1818. Amongst the servants of European residents at the chief station, of 298 individuals, 50 were seized, and 5 died; and all these were better off as to diet, lodging, and medical aid, than the bulk of the people.—In the Sylhet Corps, of 450 of all ranks, 29 cases, and two casualties, occurred; and of 230 prisoners in the Jail, 42 seizures and 13 casualties.—From a register of individuals in the town, who received aid, of 300 cases occurring in April, May and June, 1818, only 25 died; whereas of 430 cases, under like circumstances, in the three last months of the year, 84 sunk.

In the district of Nuddea, out of a population reckoned at 19,00,000, the disease between June, 1817, and July of the following year, attacked 25,400 persons; of whom died 16,500, or more than two thirds. At first the mortality amounted to one half. Of 4,789 persons to whom medicine was administered, 1,066 died; or rather more than

one fifth. In the neighbourhood of Banka, without medicine, the proportion of deaths was three fourths ; with it, only one fourth. In the town of Nattore, from September to June, 640 persons died, of a population between 45 and 50,000 : or little more than one in a hundred. In the district, the deaths were as one to four, of those affected. Numbers of women, and boys and girls, were attacked ; but no child under eight years of age.

The disease was dreadfully destructive in Burdwan. Departing from its ordinary course, it was here mildest in the commencement ; the mortality during the Rains of 1817 and subsequent Cold Weather, being only about one in four ; rising in the Hot Winds to four fifths ; and again decreasing in the Rains to one tenth. It is singular too, that during the period of greatest mortality, the persons mostly affected were the Sepoys, and well fed inhabitants of the town, whilst the convicts, and debtors in the Civil Jail, remained healthy till the Rains, when they alone were attacked. According to the Thannadar's registers, 15,571 persons perished in the Bhagulpore district between August, 1817, and May, 1818. In the beginning, all castes and classes were alike subject to its attacks ; and from August to the end of 1817, of those seized, it is affirmed, that not one in a hundred survived.

In Tirhoot it appeared from the doubtful reports of the Police Establishment, that between 9 and 10,000 persons were carried off. Here, it is said to have indiscriminately attacked individuals of all classes, and of every age and sex. In the city of Patna, the total mortality was not ascertained. In the end of 1817 the disease was more general; in the following hot winds more rapidly destructive. From the 25th of April to the 10th of July, 1819 deaths took place amongst a population of 250,000; and of 30 Sepoys attacked during that period, 15 died in spite of medicine. More males were affected than females. In Chupra the casualties were said to have exceeded 700. The mortality throughout the whole province of Behar, including Shahabad, and the Northern parts of Ramgur, was very great.

At Chunar the casualties did not exceed one tenth; at Benares one eighth, of such as took medicine. In the latter, females were seized equally with males. So, at Allahabad, persons of either sex, and of every age were affected; and the total mortality in the district is stated at between 8 and 10,000. From this city upwards, as the disease was milder, and less general in its attacks, the casualties were comparatively fewer. Thus, in Cawnpore, of 80,000 inhabitants, 500 only were seized; of whom no more than 50 died. In the adjoining canton-

ments the mortality amounted to one fifth of the diseased. In Shahjehanpore 500 died. No returns have been received from any part of Gorruckpore or Oude,\* if we except the 2nd Battalion 15th Native Infantry, which during the time it was stationed at Lucknow, had 35 cases and 11 deaths, from a strength of 1000 men. In Futtigur, the list of deaths was very small. In Coel, of 300 sick 70 died. In Agra the deaths did not exceed ten daily; although the town contained 30,000 people. Not 500 in all died in Muttra; and about a like number in the immense city of Delhi. In Meerut town, which has 35,000 inhabitants, only 400 were seized, of whom 60, or about one seventh, died: giving a proportion of deaths to the whole population of one in 120. Of 600 persons living in the great Bazar, 200 were affected, and 50, or one fourth died. Of these, 29, were men, 15, women, 3, young persons, and 3, children.—In an adjoining village, the inhabitants of which could not be persuaded to use any remedies, every individual attacked died.—In the whole district, of which only a few principal towns, as Shamlee, Dabun, &c. were visited, 1,399 deaths occurred.

\* In this province the mortality is described by eye-witnesses to have been exceedingly great, and the cause for which might be, that the inhabitants, living under a Native ruler, had not the medical attendance and medicines, which were so bountifully supplied to all persons subject to the British government.

Of the casualties it is strange, that 1,000, more than two thirds, occurred in Deoghat, a small town containing only 7,000 inhabitants, in the Begum Sumroo's territories. The fact is given on the authority of an European Gentleman, who satisfied himself of its accuracy by minute enquiry; but no mention of local peculiarities accompanies it.—In Saharunpore, no more than 250 perished, of a population of 80,000.—The mortality in the whole of the Jeypore principality is said not to have surpassed 1,200. In Kotah 100 men are stated to have died daily; but we have no precise account of its ravages in Ougein, Indore, Nagpore, or any others of the great Mahratta towns.—In Hutta, and other places in the vicinity of Saugur, the mortality was undoubtedly great; and in the district ad. joining Banda the deaths were reckoned at 10,000.—In the town itself, the disease attacked all descriptions indiscriminately from two to sixty years of age; but as medicine was sedulously administered to the sick, only 67 died of 2170 individuals known to have been seized.

Let us next examine the amount of the loss sustained in the different Corps of the Army.—In the Centre Division the mortality was, on conjecture, variously calculated at five, eight, and twelve thousand.—The truth is, that in all cases, it is next to impossible, to compute correctly, the exact amount of the vast variety of persons, con-

stituting the class of Camp followers with an Indian Army; and amid the confusion and desertion occurring in the Centre Division during the sickly period, even had its original strength in numbers been known, the real extent of its loss could hardly have been ascertained. The mortality was undoubtedly greatest from the 14th to the 19th of November; and it was calculated, that, at the very least, five thousand of all classes perished during these five days. The armed force consisted of 3,500 Europeans, and 8,000 Natives. Of the former, 230, and of the latter 534, died. The average loss of each Battalion was computed at 50 men; but this is mere conjecture, as no accurate returns were obtained.\* In some Corps the number attacked was very great. Thus

\* Since the account given above was written, the returns of all the Corps composing this force, monthly, weekly and daily, for the period during which the pestilence raged, have been procured from the offices of the King's and Company's Adjutant Generals; but they are so defective and indistinct, that little use can be made of them. Until the 16th November, the returns were weekly, and contained the sick of all descriptions. From the 16th to the 8th of December they were daily, and restricted to an enumeration of those affected by the Epidemick only; but between the 17th and 22nd of November they were very irregularly given in; as during this confusion of daily marching, amidst promiscuous attack, it was nearly impossible to ascertain the extent of the sickness and mortality in the different Corps. Another cause operated to prevent accuracy. Towards the end of the

the 1st Battalion 8th Native Infantry had 350 seizures, and 40 deaths; and the 3rd Regiment Cavalry 154, and 18 deaths. In the 2nd Battalion 1st Regiment Native Infantry, 48 Sepoys, and 25 followers died, between the 10th and 26th. From the 2nd Battalion 11th Regiment Native Infantry, 268 cases were admitted, of whom 43 died.—In the Rocket Troop, 27 Europeans, of whom one only died; and 87 Natives, of whom 18 died. Of 2,000 of all classes, attached to the King's 67th Regiment of Foot, 90 died. The mortality amongst a given number seized, varied, according to the difference in the period, and in the class of the individuals attacked. From the 10th to the 15th, it did not

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month, the survivors of the sick left at Sileia rejoined their respective Corps; and, as convalescents, were admitted into the Hospitals, without any proper distinction being made in the reports, between them and the fresh cases of disease. Two monthly returns of a more satisfactory nature have, however, been obtained; and shall be inserted at the end of the work. The one contains the casualties of the whole Army from the Epidemic, (excepting the 24th Regiment of Dragoons, and the 3rd Regiment Native Cavalry, and a detachment of the 7th Native Cavalry, then on a distinct duty with Colonel Philpot); the other the casualties of every description in H. Majesty's Troops, from October to January following. If these can be trusted, the mortality among the troops was much smaller than it is rated at in the text. For according to them, of 9,595 troops of all descriptions, only 441, or one person in 22 $\frac{1}{2}$ , were carried off. We

not exceed one in eight ; and was then chiefly confined to the bearers and other descriptions of Camp followers ; from the 15th to the 19th, it increased to one in three and a half, and then occurred, principally, amongst the Europeans and Sepoys ; and from the 22d, to the 30th, it decreased greatly. We have said, that the disease was at its height on the 18th. Of the 2nd Battalion 11th Native Infantry, 56 Sepoys were admitted on that day ; from 20 to 30 on each succeeding day to the 22nd, and from thence to the end of the month only 20 in all. Of the European Artillery, the average of deaths was one fourth ; of Golundaz, rather more than a fifth ; of gun lascars, less than a fifth ; of drivers a third ; and of Magazine men, a half. Of the

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have no grounds, on which to estimate the total number of persons affected.—It was likewise attempted to make an abstract of all the casualties occurring amongst the troops of every description (exclusive of those forming the Centre Division) as well Native as European, and Irregular as Regular, serving on this establishment. The numbers appeared wonderfully small. From November, 1817, to May, 1819, the total amount, as shewn by the Superintending Surgeons' Returns, was, of seizures 1540, and of deaths 483 : a large proportion, being nearly a third of the whole. This is entirely exclusive of Camp followers. But these returns do not exhibit a fair estimate of all the deaths ; for there is reason to suspect, that in the early part of the pestilence, many persons who died from Cholera, were classed under the head of Bowel complaints, or of anomalous cases.

Natives, the two former classes are chiefly Moos-sulmans, the two latter Hindoos. The great mortality amongst Europeans may be ascribed, to their constitutions having been previously debilitated by irregular modes of living, and uncongenial climate; to the comparative severity of the attack, and greater struggle in a plethoric habit and muscular frame. Women were equally with men obnoxious to the disease; and died in a like proportion. Thus of 268 females attacked, 43, or one-sixth died. It was observed, that concubines and prostitutes suffered in a larger proportion than other descriptions of women: probably from their dissipated habits, and precarious mode of life.

The mortality in the Hansi Force was very inconsiderable. Not more than 271 persons in all were seized; of whom 51, or one in five and a half perished. Of these a large proportion was Sepoys; of whom 126 were attacked, and 27, or rather more than a fifth, died. The majority of deaths occurred in the early part of the disease; when it was more virulent than afterwards. Six Europeans only were attacked; of whom one died.

In the Rajpootana Force, which in fighting men and followers amounted perhaps to 15,000, the mortality was greater. The armed part of the Force consisted of 96 Europeans, (Officers

not included) and 4,100 Natives ; of whom 292 were admitted, and 122, nearly one half, died. The different Corps were variously affected. Of the European Artillery, only 3 were seized : all of whom recovered. Of the Goolundaz 240 in number, 6 sickened, and 2 died ; of 250 Gun lascars, 21, of whom 12 died ; of 392 Ordnance Drivers, 44, of whom 17 died ; of 294 Pioneers, 53, of whom 23 died : Of the 2d Cavalry, 600 strong, 8, of whom 2 died ; of the 2d Local Cavalry, 720 strong, 4, of whom 2 died ; of 5 Companies 1st. Battalion 27th Regiment, 18, of whom 7 died ; of the 1st Battalion 28th Regiment, 944 strong, 135, of whom 57 died ; and of 2d Battalion 19th Regiment, 887 strong, 3, of whom none died. Of 75 Camp followers who took medicine, 15 died. Here Europeans were slightly affected, and the lower classes suffered most. This was not uniformly the case ; for according to one statement, the Sepoys suffered more than the Camp followers in the 1st Battalion 28th Regiment. By this account, the strength of the Battalion is stated at 1,004 ; of whom fell ill 144, and died 60 ; whilst of 513 Camp followers, 35 only were seized, and 14 died : the casualties among the Sepoys being in double proportion to those of the followers. The Battalion consisted of 878 Hindoos, and 126 Mussulmen ; of the former, three fifths were Bramins and Rajpoots ; the remainder of low castes—57 Bramins were taken ill, and 30 died ;

Rajpoots, 47, and 16 died ; low casts, 21, and 9 died : or of the whole affected, a little more than one half. Of the Mahometans, 19 were seized, and 5, or one fourth, died. So that the disease was more fatal to Brahmins, than to Rajpoots ; to Rajpoots than to the lower casts ; and to Mussulmans the least so of all. It was most destructive from the 14th to the 22nd September ; of 108 admitted from this Battalion in the first week of its visit, 51 died ; after which the average was about one fourth.

In the Left Division, of 8,500 fighting men, 125 cases occurred, of whom 49, more than a third, died ; 30 in April, 18 in May, and 1 in June. Here the disease equally attacked Hindoos and Mussulmans of all orders : Drivers, Lascars, Bearers, Grooms, and Grasscutters, not being more liable than the regular troops. Children were peculiarly exempt ; females not. The mortality was greatest from the 10th to the 21st April.

In the Nagpore Force, from the 31st May to the 15th June, of about 4,000 regular troops, 13 Europeans were seized, of whom 6 died ; 211 Sepoys, of whom 29, or one seventh, died. The mortality was greatest, perhaps, two thirds, at first. The Camp followers were affected very severely ; grooms more so than any others. —The Artillery lascars, drivers, and water

carriers were most exempt. Women were affected equally with men; and children at the breast were not safe from its attacks.

From the whole of the foregoing statements, we think it may perhaps be inferred : 1st, That the sum total of the mortality occasioned by the Epidemick fell far short of the rate assigned to it, by the voice of the public, during the season of alarm.\* 2d, That the mortality was proportionately much greater, among large and dense, than among small and dispersed bodies of men. 3d, That in a given place, it was generally greater in the commencement, and middle, than towards the termination of the disorder. 4th, That, when unlimited by the intervention of remedial means, it generally amounted to one half, and sometimes to two thirds of the seizures. 5th, That where medical aid was duly exhibited, it rarely amounted to one third, and was generally as low as one fifth of the attacked. 6th, That men were gene-

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\* As a proof, however, of the great extent of its ravages in the European portion of the community, the experience of two Offices, the Laudable and Union Societies, for insuring lives, where the risks taken were almost entirely upon the lives of European gentlemen, may be briefly stated here. The number of deaths amongst those insured between October, 1817, and November, 1818, was so great as to reduce the value of lives to one half of the estimate formed on the best tables, and on the experience of former years. The register of the latter

rally more susceptible than women; and that infants and children were nearly exempt.

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Society, indeed, shews a proportion of deaths for that period, four times as great as the average of the four preceding years: being no less than 6 $\frac{1}{2}$  per cent on all the lives insured.

## SECTION IX.

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### OF SOME PECULIARITIES OF THE DISEASE.

THE general appearances and habits of the Epidemick, have been already so fully described in the body of this essay, that little now remains to be added. Before, however, proceeding to treat of the curative means, a few words may be said in illustration of one or two characteristic features of the disorder, not yet alluded to. Whilst the contagious nature of the disease was under discussion, it was stated, that those lying sick in Hospital of other ailments were not attacked by it, in larger proportion than persons in health : with the single exception of convalescents, whose greater liability seemed solely attributable to their enfeebled condition. We might hence conclude, that unlike the plague, small pox, and others of the exanthemata, which, when epidemick, have been observed to suspend the influence of other maladies ; and as it were, for a time to convert all other kinds of disease into their own specific mode of action ; the Cholera has no power of transmuting, and turning to

itself, other forms of illness. In further proof of this assumption, it may be stated, that no where did the disorder, when prevailing epidemically, seem decidedly to take the ascendant ; so, as for the time, either wholly to banish, or sensibly diminish, other species of morbific action, common to the seasons and place. It is no doubt true, that throughout the whole of the year of its rise, fevers and bowel complaints were in Calcutta milder than usual ; but it is not known, that the cases were fewer in number, or that when the morbific action of fever or dysentery had once fairly begun in an individual, it was ever disposed to run into that of Cholera. It is likewise true, that in the camps of the Centre and Hansi Divisions, it was by some believed, that the common endemials of the climate were less frequent, during the period in which the Epidemick was among them ; but then, this was perhaps attributable to the milder forms of disease attracting little notice, whilst the attention of all classes was strongly arrested by the ravages of a new and formidable distemper. Besides, that this persuasion was by no means general ; at least one half of the Staff concurring in the opinion, that it did not exert any influence whatever, on other complaints.

Moreover, the probability of the supposition was much lessened, if not quite destroyed, by what happened in other quarters. Thus, in the

Nagpore Force, bilious remittents were more than commonly prevalent during the existence of the Epidemick ; and the season was particularly sickly all over the province of Berar. So, in Jubbulpore the usual diseases went on at their wonted pace ; and throughout Saugor Province the Small Pox raged at the same time with Cholera. A like circumstance occurred in Cawnpore ; in which the Small Pox was extremely fatal in April and May, 1818, when the city was visited by the Epidemick ; and in Calcutta in the spring of 1819, at the very time in which Cholera was in one of its periods of greatest aggravation. In like manner, autumnal intermittents were common in the Rajpootana Force during August and September ; and in the cities of Jeypore and Delhi, fevers of the remittent and intermittent type, diarrhoeas, and dysenteries, continued very prevalent, until the end of the Cold Weather.

Many other instances to the same effect, might be found in the Upper Provinces ; but to save needless accumulation, let us now advert to those situations in the lower part of the Country, in which the disease long existed in full force ; and must necessarily have displayed this peculiarity, if it had constituted any part of its essence. In Chupra, fevers and other endemics were less common ; in Tirhoot just as usual. Neither in Bhaugulpore, nor at Monghyr, did it exert any influence. At Malda, and at Nattore,

other diseases were less frequent. In Burdwan, bowel complaints were fewer; fevers not so.—In Nuddea, remittent fevers, liver and bowel complaints were more than usually frequent amongst Europeans; the Natives were more healthy.—At Dacca, fevers were, during the first year, less frequent; in the second, more general and obstinate. In Sylhet, intermittent and remittent fevers, running into and alternating with dysentery, were more than usually common; and it was remarked, that, so far from their shewing any disposition to coalesce with Cholera, an attack of the one disease generally protected the person attacked from the influence of the other; so that he who had fever, would not afterwards have Cholera; and *vice versa*. In Tipperah, intermittents, and in Backergunj, bowel complaints, were more general than in former years. In Mymensing, Bulloah, and Chittagong there was no perceptible difference.

From a comparison of the foregoing facts we think it is clearly deducible, that the Epidemick did not exert any influence, in lessening the frequency, or in modifying the symptoms of fevers, and other disorders common to India; and that, in every case, in which an apparent exception to the general truth of this proposition occurred, it probably arose from causes purely accidental.

The next observation to be made, is, that an individual having once undergone the disease, thereby became much less subject to be again attacked, than a person, who had not passed through the same previous seasoning. It is not by this meant to be asserted, that relapses did not sometimes occur, in persons who had not perfectly recovered from the effects of the first attack; nor even to deny, that, in some rare instances, the disease recurred at long distant intervals, when the individual had entirely regained his strength; and was to all appearance in perfect health. All that we intend to affirm is, that such cases were exceedingly uncommon. To many of the Medical Officers, who possessed large opportunities of observation, it did not occur to observe a single instance. Thus the Centre Division of the Army hardly affords half a dozen of instances; not one of which happened to the Medical Officers left in charge of the whole body of the sick, from the beginning of December until February following. Previously to the retrograde movement of the Centre Division from Erich upon Gwalior, early in December, the European and Native Sick were removed to Sumpter, an elevated healthy town, on an open plain, in which a field hospital had been established. The Sick amounted to about 200 Europeans, and 1,000 Natives. They soon got over the dysenteries and diarrhoeas, which formed the sequelæ of

the disease ; and not a case of relapse, or secondary, attack came to notice.

In the Left Division and Rajpootana Force, according to the unanimous declaration of the Medical Staff, no case of reseizure occurred, after the strength had been fully restored. In the Nagpore Force, two or three instances came to notice ; but all came under the strict denomination of relapses ; for although the individuals had recovered from the primary shock, a long enough interval from the first attack, had not been allowed, for the complete restoration of their strength. The most decided case, was that of an European, who having been twice attacked, whilst under the influence of mercury, had so far recovered, as to return to his duty ; when, after a lapse of five or six days, he got the disease a third time, and died. With the Kurnaul Division not a single case offered. The same immunity from secondary visitation, was observed in every quarter, in which the Epidemick prevailed; and we should perhaps not be far wide of the truth, were we to affirm, that of the many myriads attacked, the returns of the whole country do not afford a score of well authenticated cases of a recurrence of the disease, after the removal of debility, and every other consequence of the primary attack.

Another curious circumstance in the economy of the disease, was, that not only were persons,

who had once undergone its attack, free from its further assaults; but even individuals, and bodies of men, who having come within its pestilential influence, had escaped unaffected, were nevertheless much less obnoxious to its future visits, than those, who had not before been exposed to the virus. In other words a village, which was visited by the Epidemick during the first year of its prevalence, would, on the disease reappearing in that part of the country, be much less likely to suffer, than another village, which had not before been affected; and an individual going from the former, into the infected air of the latter, would have a better chance of immunity, than its inhabitants, who had not undergone the previous seasoning. This was the case, to a greater or less degree, in every part of the Provinces; in which it was generally remarked, that the Epidemick, on its recurrence, either did not at all revisit the places formerly affected, or only in a much lighter manner, than those, to which it was yet a stranger. In Tirhoot, particularly, in which the Epidemick twice appeared at two distant periods, the truth of this observation was strikingly illustrated; since according to the information of a very intelligent observer, not a single instance occurred, of the disease revisiting the same place, throughout the whole extent of the district.

But, it is in the different Divisions of the Army, the bodies composing which long remain

tinder the eye of the same Medical Officers, that we should expect to find the existence of this law most clearly established. It is here, accordingly, that we have the best examples of its reality. Thus in the Jubbulpore Force; the 7th Regiment of Cavalry, and 2nd Battalion 13th Native Infantry, which Corps had suffered severely in November with the Centre Division, and at the Bridge of Boats, remained quite exempt. Thus too, the 2nd Battalion 19th, which was violently affected by the disease in August, had only three slight cases in September; when the other corps of the Rajpootana force were so roughly visited. But the best illustrations are to be found in the Centre Division. When this force broke up after the termination of the campaign, His Majesty's 24th Regiment of Dragoons, and 87th Regiment of Foot, and the 1st Battalion 8th Regiment Native Infantry, marched to Cawnpore; where they were stationed in April and May, when the city and cantonment were suffering from the disease. At this time the 24th Dragoons remained quite free; His Majesty's 87th had two slight cases, among the recruits who had not been with the Centre Division, and no death; and the 1st Battalion 8th Regiment N. I. had, according to one statement, no case, according to another, one only, and according to a third, three or four, all slight attacks. The situation of the latter Corps was such, as to give additi-

al proof of the immunity of bodies previously exposed not being accidental. For it so happened, that this Battalion was placed right between the 2nd Battalion 15th N. I. and Craigie's Levies; both of which suffered severely, as not having earned the same means of protection. Camp followers of all descriptions were equally exempt; and one person only, an European Officer, who had been with the Centre Division, fell a victim to the disorder. In like manner, the 2nd Battalion 25th Regiment Native Infantry, which again fell in with the disease in April, whilst marching from the Tiraeé for Lucknow by Gorruckpore, then suffered comparatively little. It had indeed 25 cases and 5 deaths; but of these only one was a case of relapse or recurrence, and even in it the symptoms of both attacks were very mild. But, a still more extraordinary instance occurred in Lord Hastings' camp, during the march to Gorruckpore, towards the latter part of the same month. The disease here first broke out among the followers of a gentleman, who had just joined the party; and in a few days attacked between 50 and 60, out of 400, chiefly of the class of bearers. It next got among the servants of several Gentlemen in the Civil Service then in attendance upon the Governor General; and to the period of its decline, was confined to such persons, as had not been with the Centre Division. This could not be explained on any difference of situation; for the party daily

changed ground, and the new comers were mixed promiscuously with those, who had been previously exposed to infection. Nay, it further appears, that after attacking the first party, the disease made a long stretch, and next shewed itself amongst other persons, not yet seasoned, in the opposite end of the line: leaving all between untouched. If any other proofs were necessary, we might cite the case of the 2nd Battalion 3d Regiment, the greater part of which, having had the disease at Shergurh, were not at all affected, although stationed at Banda, when the town suffered severely. But enough, we think, has been already said, to shew, that the human frame, on being exposed for some time to the pestilential virus, got habituated to it, and in a great measure became insusceptible of its malignant influence.

There is reason to believe, that the lower animals were in some measure affected by the corrupt state of the air at this period. For, it was observed in many places, that an unusual mortality occurred amongst black cattle, sheep, dogs, and other domestic animals. Thus in the Backergunge District, cattle had the disorder, and were cured by opium and the other remedies found most serviceable in the human species. Cows when seized, shed their young. So, in Tipperah great numbers of horned cattle and

sheep were seized with vomiting and convulsions, and suddenly expired. In 1815 again, half the cattle of the lower part of Tipperah were carried off by a disease similar to Cholera. In Delhi, dogs died rapidly ; and more horses than usual were carried off by the dry gripes.\* In the Rajpootana Force, and throughout the whole of the Jeypore and Nagpore territories, the season was remarkably fatal to camels ; and in the Centre Division domestic animals of all descriptions died in great numbers ; but in the latter instance the mortality might be ascribed to want of proper care and food. At Sumbhulpore, an Elephant had every symptom of Choera ; and was cured by brandy and laudanum. But the affection of brutes was by no means general. Thus in Dacca, Mymensing, Rajshahy, Nuddeea, Bhaugulpore, Tirhoot, Sarun, &c. the lower orders of animals are expressly stated to have enjoyed their usual health : So that the circumstance of their sickness in other quarters, during the prevalence of the Epidemick, may have been perfectly fortuitous.

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\* In this city, a curious thing was, that large swarms of flies, which had infested the place before the breaking out of the Epidemick, wholly disappeared during its prevalence ; and returned as it withdrew. This might be owing to the cold, sharp, westerly wind then blowing.

## SECTION X.

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### OF THE TREATMENT OF THE DIS- ORDER.

IT is not easy to determine how this very important branch of our subject can be best handled. For although, there was every where a striking uniformity in the principal means resorted to, in resisting the disease : there was yet, in different quarters, a remarkable difference in their mode of application, and a great discrepancy of opinion regarding their various degrees of efficacy. With one individual, bleeding was considered the remedy to be chiefly depended upon ; with another calomel ; and with a third opium and stimulants ; just as their opinions were modified by the results of their single experience, varied according to the form of the disease, and class of subjects, chiefly coming under their notice. Hence, any one attempting to set down the results of the general experience, in the shape of a summary, would be constantly checked in his progress by the opposition of contrary facts ; and at length, harassed

by the impossibility of reconciling dissimilar judgments, be forced to give up the endeavour, as quite impracticable. The only mode, as it appears to us, of avoiding this unpleasant dilemma, is first, briefly to state the several modes of practice followed in different parts of the country; and then, to see, whether we cannot from the whole, deduce some general rules, applicable under every circumstance of the disorder. In adhering to this plan, it will not be necessary, that the exact line pursued by each individual practitioner, should be minutely described: for this would lead to endless repetition. All that seems requisite, is to notice, only such facts, as evidently tend to establish the true method of combating the disorder; or as appear important, from their novelty, or opposition to the general run of experience.

To begin with Bengal, in which the Epidemick originally excited attention. When the disease first broke out in Calcutta, with such fury as to menace destruction to every family, the public mind was naturally impressed with feelings of great alarm, and apprehension. A corresponding degree of solicitude was excited amongst the medical men; and on their part, every effort was made, to discover an adequate remedy for the evil. Bleeding, stimulants, sedatives, narcotics, and other descriptions of medicines were

successively tried ; according as analogical reasoning, or the peculiar opinions of various individuals, seemed to warrant their use. Each in its turn failed, if not always, at least so often, as to prove the extraordinary depressing powers of the complaint, and the inefficacy of all curative means, to stop its progress, where the attack was in full violence.

These failures produced a state of perplexity and indecision, which frequently induced the Medical Officer, to employ in one and the same case, and sometimes at the same moment, remedies of an opposite description ; rather than that the patient should sink, without every practicable means having been employed for his recovery. At first, laudanum, calomel in large doses, brandy, and the most powerful internal and external stimulants, were chiefly depended on ; but when these were found unavailing, and an examination of the bodies of those who died, shewed great venous accumulation in the centre, and inflammation of the stomach and intestines, a new practice came into use. From its being observed, that the blood always withdrew from the extreme vessels, and gorged the great trunks, it was naturally concluded, that the cure would lie in restoring the balance of the circulation. Hence, venesection was resorted to ; and in many cases of Europeans carried to the greatest war-

ractable extent. When the patient was of sound habit, and seen in the early part of the disease, the practice was to tie up his arm, and allow the blood to flow, until from twelve to twenty or thirty ounces were abstracted. In some instances, where the violence of the spasms, and severity of abdominal pain seemed to indicate it, or where benefit had been evidently derived from its use in the first instance, the bleeding was repeated, after an interval of some hours. We must, upon the whole, speak unfavorably of the results of the practice, at this early period of the Epidemick. It was, almost in every case, found difficult, from the sluggishness of the circulation, to get the blood to flow, even when assisted by frictions, and the hot bath. Frequently, it had a thick, jet black, oily, appearance ; and even where several veins were opened, would only trickle down in drops, so as scarcely to give a spoonful in half an hour. Sometimes, again, it would spout out freely for a few moments, as the muscles of the arm were violently contracted by spasm ; and then entirely cease, as the patient fell into the state of collapse.\* The pulse, if

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\* In some cases the blood at first flowed freely, in a good and continued stream; but instead of the action of the heart and arteries being roused by the flow, the pulse rapidly sunk ; and in a minute or two the blood began to trickle, and at length to come away in drops only.

previously imperceptible, did not in any instance return to the wrist ; and in cases in which it had been felt before, it decidedly grew weaker, as the blood flowed. No stop was put by it to the discharge by the mouth and bowels ; and the spasms seemed to hold their course quite unaffected by it. The blood, on coagulating, did not show the buffy coat ; and was rather of loose texture, with an overflow of serum. It must be confessed, however, that the ill success of bleeding at this time was greater in appearance, than in reality.—For, the persons, upon whom it was principally tried, were patients in the General Hospital composed of various classes, collected from the town and shipping ; and seldom coming under treatment, until some hours after the commencement of the attack. In His Majesty's 59th Regiment, in which the patients were usually seen at a very early period of the disease, the practice was more successful ; since of 19 men admitted into hospital, between September, 1817, and March, 1818, only three, or not quite one in six, died ; whereas of the promiscuous cases of the General Hospital the deaths were in the proportion of six to one recovery : although in both hospitals the mode of treating the patients was precisely the same.—Still, it cannot be doubted, that during the first months of the Epidemick, there were many instances, in which the loss of pulse, cold sweats, shrunk fea-

tures, and other terrible symptoms of depression, were almost immediate; and where the abstraction of blood was, therefore, from the beginning, quite impracticable. Latterly, that is in the second year of the disease, the symptoms were generally milder; and venesection rarely failed to give relief.

Blisters to the abdomen were largely employed, with a view to allay irritation and spasm. Even where they had time to rise, they were rarely useful in stopping vomiting; and probably did harm by the pain and uneasiness of a large, exposed surface; the raw sides of which were constantly brought into contact, by the agitation of the patient's body. In some instances, a tin plate oval vessel, shaped so as to fit the pit of the stomach, and filled with very hot water, or a towel dipped in water heated nearly to the boiling point, and immediately applied to the abdomen, was usefully substituted for blisters. In many cases, it was thought, that setting fire to balls of cotton dipped in oil of turpentine, and placed on the Epigastric region, prevented recurrence of spasm.

The warm bath, heated as high as the finger could bear it, was administered in numerous instances. It allayed the spasms; partially restored the circulation; and, perhaps, diminished the sickness; so long as the patient was kept in

the water.—But these advantages were merely temporary; for the moment he was removed, the cramps and other deadly symptoms recurred; and the general debility was evidently increased, by the previous exertion. In some instances, the patient remained immersed in the bath during several hours, with little perceptible benefit.\*—Friction with camphorated spirits, Arrack, laudanum, anodyne liniments, &c.; fomentations, and the application of dry heat in bags of sand, or bottles of boiling water; placing stoves with live charcoal under the bed, and wrapping the body in blankets and flannel, were among the most successful means of bringing back the heat of the surface.

Meanwhile, internal remedies were not neglected. Large doses of laudanum, and of calomel, were in all cases exhibited; with cordials, as soon as the patient was seen. Sixty drops of laudanum, with a dram of vitriolic ether, or a desert spoonful of warm brandy, were poured into the stomach, every ten minutes, or quarter of an hour; until diminution of spasm, retching, and anguish, and partial returns of heat, and circula-

\* Sometimes, the patient had a great aversion to the bath; and struggled violently, whilst being placed in it.—Sofnetimes, the attempt to move him produced a violent return of the spasms, or retching. Invariably did it seem to increase the debility. In the latter stages of the attack, a dread that the patient might die in the act, generally deterred the attendants from its exhibition.

tion shewed, that the powers of life were again beginning to act.\*—The calomel was given in doses of from ten to forty grains; and, unless where rejected immediately upon being swallowed, repeated at intervals of four or six hours.—When the calomel was thrown up, it was repeated every little while: the patient being, in the meantime, kept from drinking even the smallest quantity of fluid.—This was undoubtedly the mode of practice most successful in Calcutta.—It may, however, be questioned, whether the calomel was generally serviceable, until the stimulants and anodynes had in some degree quieted the stomach.—In the General Hospital, it did not in any one instance appear to exert any specific power in checking the vomiting or spasms; and the majority of the medical men at the Presidency concurred in thinking, that it was only beneficial, in so far, as it tended to emulge the biliary ducts, and to promote the regular alvine discharges. Others, again, no doubt believed, that it would stay on the stomach, when every thing else was rejected; and reckoned upon it, as their chief means in the cure of the disorder.

The diffusible stimuli employed were very various. Volatile alkali, in combination with brandy,

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\* The laudanum and brandy were sometimes pushed to such extent as to produce intoxication; but the appearance of this state was no sure sign of the patient's escape.

rum, and other vinous spirits; sulphuric and nitrous ether, beer, essential oils of cinnamon, peppermint, anise, and juniper, tincture of Lavender, camphor, mulled and plain wine, and the empirical bitter tincture named *Drogue Amere*: each had their advocates, and all were probably found useful, exactly in a ratio with the extent of their stimulating powers. Anodyne and stimulating enemas, were likewise beneficial, where the dejections were very numerous.

If, by the exhibition of these means, or by the strength of his constitution, the patient were so fortunate as to withstand the first violence of the attack ; the tone of the bowels, after the lapse of two, three, or even four days, got sufficiently re-established, to allow purgative medicines to act ; and then the calomel began to shew its peculiar power of emulgizing the chylopoetic viscera, by discharging downwards, large quantities of dark, vitiated bile. It was necessary to assist this operation, by the administration of repeated doses of compound powder of jalap, infusion of senna, and other saline and resinous purgatives. But, as the system, during the whole process of throwing off these depraved secretions, was in a state of high excitement and disturbance ; and apt<sup>o</sup> to sink beyond recovery, from the slightest error in practice ; great discrimination was required, in the mode and time of administering the cathartic medicines. And, the utmost

care was necessary, to keep up the strength of the patient by the use of gentle tonics; and, by the constant exhibition of small portions of wine, sago, arrow root, jelly, soup, and other articles of mild nourishment, to prevent his being exhausted, and carried off by excessive ventral discharges. The foul, dry tongue, parched mouth, thirst, irritation of stomach, hurried pulse, hot skin, and general feverishness, which marked this stage of reaction, sometimes continued many days; and were treated with the remedies found most readily to relieve similar symptoms in common cases of fever. Relapses, which during the state of great debility were not very uncommon, and proved very fatal; required no difference of treatment.

Amongst the Native patients, the treatment consisted in the judicious use of opium and stimulants; followed up by calomel, and other purgatives. In such cases, as happened to come under the immediate care of the European practitioners, the plan usually followed, was, as soon as the stomach and bowels had been pretty well emptied of their immense load of watery secretions, to give from sixty to eighty drops of Laudanum, in strong brandy punch, or with aromatic spirit of ammonia, and peppermint water; and to repeat the dose within ten minutes, if the vomiting and purging threatened to recur. If these means failed to check the

progress of the disease, which was rarely the case, a bolus containing fifteen or twenty grains of calomel, and one grain of opium, with the aid of frictions with hot oil, flannel, &c. usually succeeded in quickly subduing irritability, and changing the diseased action. And, as there was no stage of reaction with this class of persons, the cure required nothing more for its completion, than a dose of castor oil, or other mild laxative. Nearly the same treatment was followed by the Native Physicians,\* and others in distant parts of the city, and suburbs: that is, solid opium, laudanum, ether and other stimulants were very freely used in the first instance; and subsequently unusually large doses of calomel, upon the primary symptoms being checked. The latter medicine, by men of the largest experience of the disease amongst the Native part of the population, was deemed to have no specific

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\* Immediately upon the disease assuming a decidedly epidemical form, instructions were humanely issued by Government to the Magistrates in different quarters of the country, to entertain Native Physicians at the public expence; and station them, with the necessary supply of medicines, in the places, in which their services seemed to be most wanted. Medicines were, at the same time, given for distribution to the Native Police Officers and respectable land-holders, and to all European gentlemen not in the service, residing in distant parts of the several districts. It would be impossible to calculate the quantity of life that was saved, by the adoption of these truly paternal, and humane measures.

effect in allaying the distressing symptoms. The preceding means were eminently successful in subduing the attack; since it appears that of 35,796 persons so treated, by the Native physicians at the Presidency, only 2308, a little less than a fifteenth part of the whole, sunk under the disease. Probably, an equal, or even a larger number of individuals was saved by a similar practice, in the Dock Yards, Cotton Works, and other large establishments adjoining the city; the superintendents of which were liberally supplied with the requisite means, to be dispensed as occasion might require, among the many thousand workmen under their charge.

Nearly the same means were used in the Jessor, Backergunge, Mymensing, Chittagong, Dacca, and Tipperah districts. Bleeding was now and then resorted to; but with no evident advantage, even where the blood could be got to flow. In lieu of calomel the seeds of the purgative nut *Jumalgota* (*Jatropha carcas*) were sometimes beneficially substituted; and, after the removal of the disease, the tone of the stomach was restored by infusions of *cheryta* (*gentiana cheryta*) and other light bitters. In all these quarters, it was deemed a very favorable symptom, if drowsiness were produced by the narcotics. After sleep, the patient generally awoke much relieved; with a warm equable

sweat all over his body ; the spasms and general irritability gone, or greatly diminished ; and with only one remaining unpleasant symptom : extreme thirst. To relieve this, small quantities of brandy, or other spirit, and water, or of a watery infusion of spices, with saline effervescent draughts, were, from time to time, administered.

In Sylhet, it was sometimes found, that where neither solid opium, laudanum, nor cordials would remain more than a few minutes on the stomach, scruple doses of calomel would allay the irritability, and produce the relief sought in vain from other means. In general, however, opiates, brandy, and spirits of ammonia and lavender, were used as auxiliaries. The patient was always prohibited from drinking large draughts of any liquid ; and his thirst was allayed by spoonfuls of rice water spiced, with the addition of a little spirits ; and in some cases, the corner of a towel dipped in water, and then slightly squeezed, was given to him to suck. This plan was generally successful. In May, 1818, however, a Sepoy was attacked, in whom the sickness and retching were so violent, that nothing would even enter the stomach.—A vein was opened ; and as the pulse was still firm, twenty ounces of blood were taken away, until deliquum ensued. The best effects were instantly apparent.—The vomiting ceased ; opium and

calomel were given, and retained; and after taking one dose of castor oil, the patient on the fourth day returned to his duty. Subsequently to this, venesection was, in the first instance, employed in every case, in which the pulse could be felt at the wrist; and whenever the blood flowed freely, the sickness, spasms, and burning sensation at the scrobiculus cordis were invariably relieved. But calomel, and laudanum or opium were always administered, either immediately before, or after the bleeding.

In Rajshahy, laudanum and opium, with cordials and frictions, followed by mild laxatives, were in the early period of the Epidemick, very successful. Afterwards, opium and calomel combined, followed by drastic purges chiefly composed of calomel; blisters to the stomach and extremities; cordials; frictions; and glysters, were the means principally trusted to. Then mercurial pill, and infusions of gentian and *cheryta*, were employed, as alteratives and tonics. In the neighbourhood of Baulea, in addition to the antispasmodics and sedatives, sinapisms to the pit of the stomach, and the internal use of the expressed juice of green ginger, proved advantageous. In Nuddea, in the latter periods of the Epidemick, bleeding was successfully used in more than forty cases; and only three instances of failure offered. Sometimes, it was necessary to open two or three

veins, before the blood would flow. No faith was placed in the efficacy of calomel alone. Opiates, cordials, and purgatives were mainly depended upon. Solid opium was more frequently retained, than the same medicine in a liquid form. Aloes, rhubarb, and jalap; calomel with the purgative extracts, were given until healthy evacuations were produced. Stimulating and warm tinctures, of myrrh, and other gums, proved good auxiliaries.

At Burdwan, where the disease appears to have been more virulent than in any other quarter, the repeated failure of every probable means of relief, at length, left the Medical Officer in doubt, whether the attack were more frequently arrested, or mitigated by human skill, than by a simple obedience to the wants and cravings of the sufferer, and dependence on the unaided powers of nature. The disease seemed to proceed onward to destruction, without being checked by any power opposed to it; and seldom failed to secure its victim, where the vomiting had been trifling, and had early, and spontaneously ceased. The disease was most readily controlled amongst the convicts, and lower orders of the Natives. In these cases, no alteration could be perceived in the appearance of the excretions, after the first symptoms had subsided; and large and repeated doses of opium were eminently serviceable. The quantity of laudanum given with ultimate success, not

unfrequently amounted to eight and ten drams within the first twelve hours; and it was necessary to repeat it, in doses of forty drops every six hours, for several days, and gradually to discontinue its use. At this time, the least dose of calomel increased the affection; and opening medicine exhibited in very small quantities, during any stage of the disease, was invariably, and immediately followed by relapse. With the Sepoys, again, and those of a higher and more respectable class, even where their age and constitution was such, as to lead to an expectation of great resistance to the power of the disease, its character was of a most formidable nature; and after the first shock had been sustained, the only chance of safety seemed to rest upon inducing free alvine evacuations.—Here, accordingly, calomel and laudanum conjoined, were more efficacious in relieving the vomiting and purging, than calomel alone. The stools were like tar and blood; and recovery was in no instance obtained, except where they were early and plentifully procured; and where their condition rapidly changed. As in neither form of the disease, were spasms of the trunk or extremities present, in any case; and as complete exhaustion was always a speedy attendant on the attack, there was no inducement to blood letting. .

In the Bhaugulpore District, the powder of  
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dried *Neem* blossoms\* (*Melia Azadirachta*) given in repeated doses of twelve grains, seemed to check the vomiting and purging; but, as it was usually administered in conjunction with opium, the extent of its counteracting power cannot, without farther experience, be determined. At Malda, Monghyr, Patna, and Moozuffupore, opium and calomel, combined with cordials and other auxiliaries, were principally trusted to.—In Tirhoot, large doses of Calomel, often repeated, were resorted to in the second year of the disease. Pills of Calomel and opium were distributed amongst the Native population in the neighbourhood of the Indigo Factories, all over the district, and used with great success.—At Mullhye, after the failure of the combined plan to remove the agonizing thirst and burning heat, and its appearing to cause constipation, scrupule doses of calomel alone were substituted, with manifest advantage. It was rarely found, that more than two doses were required to allay the irritability; after which, a purgative of compound powder of jalap, and calomel, given at an interval generally of eight or ten hours, completed the cure.—The discharge produced by this, was usually only a little watery fluid; mixed with mucus, and very offensive.—The patient was allow-

\* An aroid bitter largely employed by the Native physicians; internally, in bilious and pituitous disorders, herpes, leprosy, and foulness of blood; externally, as an application to tumours and bad sores.

ed to quench his thirst, by swallowing a little plain rice water, or by gargling his mouth frequently with a mixture of vinegar and water. When the extremities were cold, and the muscles cramped, fomentations, frictions, and heat in various forms were applied; but in no instance were internal stimulants given to excite reaction, as they were observed invariably to do harm by disturbing the functions of the stomach.

At Chuprah, the disease was at first peculiarised by strong spasmodic action; and yielded to large and repeated doses of powerful stimulants and opium. Counter irritation, effected by raising the skin near the scrobiculus cordis, or opposite the seat of the most violent pain, was in every instance very beneficial; and as the ordinary vesicatory means would, from the great rapidity of the disorder, not have had time to act, even had the skin been sensible to their stimulus, the burning of a piece of real, or factitious moxa, on a circumscribed portion of skin, was substituted in their room. It is added, that it is impossible to speak in too high terms of this simple expedient; as giving instantaneous relief to the patient, and much valuable time to the medical man, for the exhibition of other remedies.— Latterly; when the spasms were mild and uncommon; when the attack was less sudden; and the vomiting and purging, with pain of the abdomen, were the most distressing symptoms; calomel in large

doses, and brisk purges were very advantageous; while the former method was decidedly mischievous.—At Buxar, large and frequent doses of laudanum, combined with two parts of tincture of catechu, and three parts of any cordial tincture, or of brandy, were administered beneficially in every case. Calomel was not at all employed.

In various parts of the district of Chunar, bleeding was tried without advantage ; in the severer cases, the blood would not flow ; and in those, in which it did, no perceptible benefit followed. Purgatives, in the first instance, were always prejudicial ; and opium and stimulants could alone be relied upon.—In some instances, in which the patient had been for hours retching and straining without bringing up any thing beyond a little phlegm or mucus, full vomiting gave immediate ease. In such cases, the quantity of watery fluid ejected, would sometimes exceed a quart.—In the cold stage, which for several hours, in most cases, preceded death, stimulants, under every variety of form and combination, were tried in vain : mustard poultices to the pit of the stomach, spine, and feet ; injections of camphor, ether, turpentine, and opium ; and all other means, proving insufficient to rescue the patient from impending death. Among the Europeans in the Fort of Chunar, direct stimulants were laid aside, upon being found to prove hurtful ; and the lancet was

used, with the happiest effects, in every case, in which complete exhaustion had not taken place.—The plan followed, was to take at once twenty ounces, or more ; and if the symptoms did not soon yield, to repeat the bleeding, to the same extent, in an hour and half, or two hours.—The blood in most cases flowed easily ; but where the veins in the arm were small, the jugular was opened in their stead. Calomel, given by itself, appeared to increase the irritation of the stomach.

Amongst the Native population of Benares, the anodyne and stimulant plan, succeeded by Calomel, was generally successful.—In addition to the ordinary outward stimulants, frictions upon the Epigastrium with powder of cantharides and oil of turpentine, were tried.—With Europeans, in whom strangury was no unfrequent accompaniment of the disorder, the benefit of such practice would perhaps be problematical. In four men out of six, upon whom bleeding was practised, the circulation was too languid to allow the blood to flow ; in the remaining two, who were young plethoric Sepoys, and presented themselves at an earlier period of the attack, the abstraction of twelve ounces was attended by an immediate removal of all alarming symptoms ; and followed by a speedy recovery.—In the case of an European, the vomiting, pain, and burning heat of stomach,

were relieved by the application of leeches to the Epigastric region.

At Allahabad, bleeding was not used, either with Europeans, or with Natives ; the common mode of treatment being in all cases resorted to. The same plan was followed by the several Medical men at Cawnpore with the Native part of their patients. By none of them was calomel conceived to prove generally useful, until the stomach was prepared for it, by the exhibition of stimulants and opiates.—When the vomiting was allayed, calomel alone, or combined with extract of jalap, colocynth, or other active purgative, was administered. The partial application of heat to the surface, by fomentations, hot bottles, bricks, or stones, was preferred by some to the bath or pediluvium ; upon its being observed, that the fatigue and disturbance caused by moving the sufferer, were, as in Calcutta, more than a counterbalance to its good effects.—In the more fatal cases, it was not difficult to check the vomiting ; but the spasms could not by any means be allayed ; nor the circulation and warmth of surface restored. Large blisters were in many applied to the pit of the stomach ; but the patient's fate was generally determined ere they began to rise. Bleeding was rarely tried. In one case, in which it was carried to the extent of twenty ounces, it did not seem to produce any effect, in allaying

spasm, or relieving irritability of stomach, Amongst the Europeans, venesection, the free use of purgatives, blisters, the warm bath, and occasionally opiates, were administered. Relief was not always immediately consequent upon the bleeding ; the patient, sometimes, remaining in great danger, till stools tinged with bile were procured.

In His Majesty's 21st Regiment of Dragoons, which had occasional cases from the month of September, shortly before the time of its leaving Calcutta, until the end of May, when the disease ceased to be Epidemick at Cawnpore ; the following was found to be the most successful mode of treatment. The patient was placed in a warm bath ; and a scruple of calomel in powder, followed by an ounce of castor oil or Epsom Salts in peppermint water, given to him. If this were rejected, a dram of laudanum, and of sulphuric ether, in peppermint water, was substituted ; and the calomel afterwards frequently repeated. Blisters ; frictions ; fomentations ; anodyne and fetid injections ; and saline and other purgatives, were used as auxiliaries. In some, the calomel was combined with solid opium. Brandy and water could seldom be retained on the stomach. Bleeding was tried in four cases, in which spasms were the primary symptoms, and the very cold surface and feeble

pulse had not supervened. In two, it appeared to produce beneficial effects ; and the patients recovered. The two others died ; and from one of them, only six ounces could be procured. The success attending it was not such, as to lead to a belief, that it could be safely resorted to, in the severe or advanced stage of the complaint. And yet, in those attacked in this corps, the severity of the spasms, and other characteristic symptoms, during life, and strong appearance of abdominal inflammation after death, were peculiarly remarkable ; and the large proportion of deaths, ten out of nineteen, proved the disease to have existed in extreme violence.

In the Governor General's camp, near Gor-ruckpore, blood could seldom be procured in the more aggravated cases; but where it flowed readily, it frequently removed the great collapse of the arterial system, after the most powerful stimulants had failed in producing any effect. Calomel in doses of 30 grains, repeated if necessary, soothed irritation, and immediately induced sleep.

At Futtygur, the combined use of mercury, opiates, and stimulants was generally successful. Friction of the extremities with hot *Ghee* (a native preparation of clarified butter) in which common Salt was suspended, seemed to relieve the spasms. Bleeding, in some early cases,

was useful ; in general, it could not be practised ; and in one case, in which the brachial veins would not bleed, the temporal artery was opened and twenty ounces abstracted ; yet the patient died. In one form of the disease, however, in which there was violent pain of the stomach, with nausea, vomiting, intense thirst, headache, blood shot eyes, and quick strong pulse, without purging ; venesection, followed by large doses of calomel and purgatives, was resorted to with the happiest effects. At Agra and Coel, there was no departure from the common modes of practice.

At Muttra, in some very violent cases, simple dilution, by means of large draughts of water, as hot as it could be borne, seemed to act like a charm, in checking the vomiting and purging, and restoring the pulse and natural heat. A gentle perspiration broke out ; and the cure was completed by a dose of calomel, or castor oil. In the case of an European Artillery man, labouring under the worst symptoms of the disorder : severe head-ach, tightness across the chest, difficulty of breathing, thirst, burning sensation of stomach and bowels, scarcely perceptible pulse, sunk eyes, ghastly countenance, and tormenting spasms of the extremities : instantaneous relief was afforded by blood letting. When about twenty ounces

had flowed, the man called out, that he was perfectly well; his countenance brightened; his eyes regained their lustre; and his pulse filled,—and health was restored by one dose of calomel and castor oil. In this case, the blood at first came with great difficulty. The Natives were successfully treated with laudanum, cordials, and calomel.

In Delhi, bleeding was tried in every case, in which there seemed a chance of its proving successful; but as the vessels collapsed generally within two or three hours, and sometimes within a few minutes, it was vain to attempt it, except in the earliest stage of the attacks. No patient died from whom twenty-four ounces could be got speedily. Others again, from whom a smaller quantity was obtained, slowly, and with much difficulty, did not recover. After bleeding, large doses of calomel alone, or conjoined with opium and cordials where there was much alimentary discharge, followed up by saline and resinous purges in infusion of ginger, succeeded well. In many cases, mercury sat better on the stomach, when given without stimulants. These means, generally, soon relieved the bowels, by bringing away large quantities of dark, offensive matter, mixed with mucus and bile; but when they failed to produce this effect, recovery was greatly re-

tarded; and it was necessary to commence a course of mild mercurials, and tonic purgatives, to remove the acidity, flatulence, and sluggish state of the viscera, which then invariably remained. In aid of other endeavours, to restore the circulation and exterior heat, embrocations with country cantharides (*meloe trianthema*) and opium in bazar spirits, were sedulously applied to the abdomen. The good effects of the warm bath, fomentations, and blisters were in some measure doubted. Injections of assafoetida were supposed to lessen abdominal pain and spasm. In several cases, in which the vomiting and purging had spontaneously ceased, the extremities become cold, and the pulse left the wrist, from the advanced state of the attack, a large dose of calomel was observed to tranquillise the patient; produce diaphoresis, and moisture of tongue; allay internal heat and thirst; and pave the way to a recovery, previously almost hopeless.

In Meerut, little opportunity offered, of judging of the general effects of blood-letting; for few plethorick Europeans presented themselves; and with the Natives it was almost always found impossible to make the blood flow.—One case, however, deserves notice, from the strikingly beneficial use of the lancet. A stout young Bramin was sud-

denly seized, in the most violent manner, with the disease. He was immediately seen; and twenty-four ounces of blood were drawn from a large orifice. Even after the blood had begun flowing, the vomiting, purging, and other violent symptoms were in full force; but as the quantity taken increased, they gradually disappeared; the pulse rose; the countenance brightened; and the patient declared himself to be freed from the severity of pain. A dose of laudanum, followed up by castor oil, completed the cure; and next morning, all that he complained of, was, a sense of stiffness in the limbs, and of general soreness, as if he had been beaten, by a stick: the usual after effects of spasm, and violent exertion. The mode of treatment usually pursued, was either immediately to commence with large doses of laudanum (from 60 to 120 drops) and cordials; or previously, to cleanse the stomach, and endeavour to renew the healthy action of its vessels, and those of the skin, by the administration of small quantities of rice water, or slightly aromatic diluents. The dose of laudanum was varied according to the strength of the patient, and violence of the spasms; and repeated once, twice, or even thrice, within an hour: suitably to the urgency of the case. Where obstinately rejected by the mouth, the opiate was repeated in double doses by clyster. When the extreme violence of the symptoms

was by these means subdued, and the vital powers so far restored, by the exhibition of small quantities of salop and sago, with spiced madeira or brandy, as to produce an equable moisture on the skin, a moderate dose of castor oil, or some other laxative, was given, and repeated, with or without calomel, until the uneasy sensations of heat, and fulness of the primæ viæ, were removed. It was, in all cases, deemed indispensably necessary, to support the strength, by small quantities of light nourishment, repeated at short intervals. The warm bath, fomentations, and frictions with hot flannel, were, meanwhile, used as auxiliaries. No manifest advantage accrued from imbrocations with warm oil, spirit of turpentine, or tincture of cantharides; or from the application of hot sinapisms. The exhibition of calomel and other cathartics, was generally postponed, until the spasms and intestinal irritability had been allayed. Even after this period, their operation was sometimes conceived to prove hurtful, by adding to the direct debility, previously induced by the vast visceral discharges.—In other cases, the administration of calomel, in scruplē doses, seemed to increase the irritability of the stomach; and the practice was thence abandoned. Some gave large doses of opium, with, and without calomel, and succeeded equally with both plans. In some advanced cases, the calomel seemed to soothe the bowels

and aid recovery ; but then it should be remembered, that in such instances, the patient, having outlived the most active stage of the complaint, his fate would probably have been the same, with or without the intervention of medicine. It was upon the whole, concluded, that it generally proved hurtful in the early part of the attack ; and that amongst Natives, its use might in general be advantageously superseded, by giving, in its room, small doses of very mild laxatives.

Having now mentioned the principal varieties of treatment followed at all the great stations successively visited by the Epidemick, it would be a mere waste of time, and of the reader's patience, were we to persist in minutely describing the endless diversity, which obtained, in the exact mode of applying the several great means of which they consisted, at the different outposts, and places of scanty population.—However they might differ in the order and time of their application, opium and calomel, were used by all the Medical Staff; and in almost every case fled to, as the sole means of resisting the disease.—Let us now, therefore, turn to the several Divisions of the Army, where, from the greater width of the field of experience, larger opportunities offered, of judging of the efficacy of the different remedies employed; and every observer was

enabled, from personal communication, to profit by the observations, and opinions of his brethren.

In the Jubbulpore or Left Division, the mode of treatment with all the practitioners, at first consisted in opiates, carminatives and calomel. Stimulants and antispasmodics were varied. Volatile alkali in combination with vinous spirit, sulphuric and nitrous ether, essential oils of peppermint, juniper and anise, tincture of lavender, brandy, and wine were severally employed. Frictions, fomentations, application of dry heat, and blisters, were successively tried. Calomel was in all cases administered in large doses, at short intervals; followed up, after a proper lapse of time, by saline purgatives. In cases in which it was rejected, or did not appear to produce sufficient effect, the rapid saturation of the system by fumigation with cinnabar; inunction on large surfaces; passing of shocks from a galvanic pile through the region of the liver; the internal use of oil of turpentine; immersion in warm water; and friction of the whole body with stimulating oils and liniments, were severally resorted to, amid the alarming difficulties which surrounded the practitioner. At an early period of the attack, bleeding was generally followed by an alleviation of symptoms; particularly of anxiety and spasm.—But, the state in which the men were generally brought to the hospitals, ren-

dered the practice in most cases hopeless. In some, the blood would not flow; in others, when the pulse was strong, and the blood came freely, it produced no benefit; whilst in others again, carried to the extent of sixteen ounces, and aided by repeated doses of (40 to 60 grains) calomel, and other cathartics, it produced a favorable result. In these latter cases, opiates and stimulants of all kinds were withheld; and diluents freely used.—The blood was rather loose in texture, and shewed no buffy coat. The pulse did not rise immediately; but in the course of an hour an evident mitigation of symptoms appeared, and amendment was gradual. Other cases, again, proved fatal when bleeding and purging had alone been relied on; so as to leave the mind in doubt, whether those that had been cured, were not originally less violent affections. It being thought, that those cases, in which opiates were exhibited, either alone or with cordials, and calomel, generally proved fatal, the use of them was latterly entirely abandoned in several Corps. With persons of this opinion, their employment was superseded by the exhibition of ether, ammonia, and other cordials calculated to allay the irritability of the stomach, and rouse the general system, without producing constipation; and by jalap, and such other cathartics, as readily brought away those dark and foetid stools, on which the cure was supposed mainly.

to depend. Calomel was, by some, conceived to quiet the alimentary canal ; by others, it was rejected as too sluggish in its cathartic operation. In no instance, was this medicine trusted to alone.

When the Epidemick first broke out in the Nagpore Subsidiary Force, the attacks were so exceedingly virulent, and the irritability, spasm, and universal depression so violent, as to be quite beyond the reach of art. The fate of the patient was so quickly decided, that of seventy or eighty patients brought to the hospital in the course of the first day, more than ten were found dead, or in the act of expiring in the Doolies. In such terrible examples of the disease, it was vain to try to bleed ; for there was no pulse at the wrist, and arterial action was so completely gone, that the heart had no power to propel the blood from the centre. The internal exhibition of stimulants was equally useless ; for in all, the abdominal muscles were spasmodically contracted, and drawn back to the spine ; and the stomach instantly rejected, without distinction, every thing that was poured into it. When, however, the violence of the disease had somewhat abated ; and the spasms of the belly, and general cramp were less marked, medicine was of some avail. At this milder period, Laudanum, brandy, and other stimulants, usually quieted the patient, and induced diaphoresis and sleep ; after which

nothing more was required, than a dose of compound powder of jalap, or castor oil, to unload the bowels, and procure fœculent or biliary motions. By the unanimous consent of all the staff of the Division, calomel was reprobated as injurious, in every case, and form. In whatever way given, in repeated scruple doses, with or without other aid, washed down with fluid, or dry on the tongue, whilst fluid of every sort was denied to the sufferer; still, it was immediately thrown up, and invariably added to the irritability of the stomach. In many cases solid opium was observed to be kept down better than laudanum. Magnesia, in peppermint water, was useful in allaying sickness, and by passing off readily by the bowels. As auxiliaries in restoring superficial warmth, blankets, frictions, fomentations, blisters, and occasionally the hot bath, were found beneficial. In camps, however, the warm bath can seldom be employed on a large scale. It is too cumbrous in its form, and consumes too much hot water, to be used in situations in which, as here and in the other Divisions of the Army, the individuals likely to derive advantage from it are hourly pouring in, in almost unlimited numbers.\* At Mooltye again, and Hoshun-

" \* Mr. Dalton, Superintending Surgeon on the madras Establishment, recently suggested a very happy means of removing the obstacles to the general use of baths in armies and camps. The following is a description of the apparatus used by Mr. Dalton.

gabad, where the Epidemick attacked Detachments of the same body of Troops, calomel when given alone, was conceived to allay the irritation of stomach and urgent thirst, and even in fatal cases, to afford much relief. It was generally, however, combined with opiates and

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*"Method of using the Medicated vapor Bath."*

"Take a rattan or widely taped couch about  $2\frac{1}{2}$  feet from the ground, and tightly surround the frame with a thick *cumbly* valence, or flounce, to reach or trail on the ground 3 inches, or more; then cover the rattans with a *cumbly* or blanket to reach over the sides of the couch a few inches, on which lay the patient, who must be covered *lightly* with a longer blanket or *cumbly*, as a bed is covered with a counterpane. When this is done, take two metallic basons and put half a pint of good ardent spirits into each, and into each basin place a metallic cup with as much vinegar as will quarter fill it, to which must be added, one or two drachms of camphor, dissolved in a little rectified spirits of wine, with a scruple also of opium, if necessary; then lift up the valence or flounce, and place the basin with the tumblers or cups therein, under the couch at an equal distance, and throw a small piece of lighted paper into each basin, when the spirits will immediately take fire. The flounce, or valence must be replaced without delay, to prevent the escape of the heat and vapor, which in 2 or 3 minutes will be so great as probably to render the removal of one of the basons expedient or necessary, as the heat of the Vapor Bath duly prepared, is only known to those, who have judiciously used, and prepared it, according to my directions."

The employment of steam, spirit, and medicated va-

carminatives. Bleeding was uniformly inadmissible from the early depression of the vital powers.

In the Rajpootana Force, bleeding was largely practised, with various result ; according to the period, and severity of the attack. If a patient were brought in soon after he was seized, with a full, or even moderate, pulse, severe vomiting, and purging, and spasms of the belly and extremities ; he was generally bled, to a pound, or a pound and a half. In all the Europeans, and in some of the Natives, so treated, the practice appeared to produce beneficial consequences. If the blood flowed freely, the pain of stomach, and harassing muscular spasm, were mitigated ; and the ventral discharges lessened ; tranquility and perhaps sleep, ensued ; and a warm critical discharge soon broke out over the whole of the body, and

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por baths is almost as old as the medical art itself ; and an apparatus somewhat similar to that used by Mr. Dalton may be found described in the old systematic authors : see particularly Hoffman *cap. de balneorum usu*, vol. 1st. P. 465 ; and vol. 4th. P. 292 and 314 ; but Mr. Dalton has the merit of first applying them to the cure of the recent Epidemick. Dr. Girdlestone, indeed, states that a Dutch Physician was in the habits of employing them, at the time the disease prevailed generally on the coast in 1782 (see Essays P. 64) ; but then he used stoves instead of the spirit lamp.

removed the severity of the complaint. But with many of the Natives, the circulation was so languid, from the beginning of the complaint, that no blood could be obtained. Thus in the first Battalion 28th, from 144 patients in hospital, the lancet was used in 77 ; of these 20 bled freely, of whom 3 died ; and from 57, little or no blood could be extracted, of whom 42 died. This average would speak much in favor of the practice, if all the cases, in which it was tried, had been of equal degrees of violence. But this was far from being the case ; for those, in which it succeeded, are stated to have been slight affections, in which the circulation was little impaired, and the general system not greatly depressed ; whilst the unsuccessful cases were so violent, as to leave it doubtful, if the bleeding produced any sensible effect, good or bad. Again, of twenty cases bled in the first Battalion 27th Regiment, not more than three or four ounces were obtained from five ; and from the remainder from twelve to sixteen ounces. Nearly the whole of these men were bled soon after the commencement of the attack ; and the opposite results of the practice, seemed to depend, more upon the different degrees of depression, produced on different constitutions, by the malady, within a given time, than upon any difference in the length of its duration. The blood did not shew any buffy coat ; nor did the

pulse rise rapidly on its abstraction. Along with bleeding, where its use seemed to be indicated, opium in a solid or fluid form, camphor, brandy, oil of peppermint, and various other stimulants, external and internal, were solicitously employed with various success. In the earlier days of the Epidemick, when it had not arrived at its greatest degree of malignity, they no doubt often rescued the patient from death. But at a later period, they often seened of no avail. Then, the disease marched on to a fatal termination, in spite of every human means; the stomach indiscriminately rejected every thing that was offered to it; and the spasms and vomiting, and internal heat continued unabated by calomel and opium, whether given separately, or administered together. In the cases which proved favorable, the opiates and calomel were repeated every second or third hour, until the cramp, oppression, and other violent symptoms subsided. Where the stomach would not bear laudanum, solid opium was given in its place. Cold water, and fluids of every kind in large quantity were rigidly abstained from. Thirst was mitigated by warm rice water in mouthfuls. Some of the patients fell asleep after the first dose of opium; others after a second. They awoke with a warm moisture on the skin; and the spasms and irritability of bowels quite gone. In some cases, the ex-

hibition of the different spirits was pushed so, as to cause slight inebriation, with apparent advantage; in others the patient was thought to recover more rapidly, if the mercury touched his mouth.—In all, the cure was completed by laxatives. Calomel alone, was seldom used; in the few instances in which it was solely trusted to in the first instance, no confirmed good opinion was formed of its efficacy.—With some careful observers, large experience both here and in the Left Division, produced a conviction, that the primary exhibition of narcotics and stimulants, was not nearly so successful in allaying the morbid action of the intestines, as the practice of first unloading the stomach of its noxious contents, by the use of simple diluents, or infusions of anthemis and other plants.

In the Hansi Division, venesection according to the age and constitution of the patient was very freely practised, with good success. Amongst Europeans, and the robuster class of Natives, one copious bleeding, to the extent of twenty, or twenty-four ounces, taken in a short space of time, almost in every case produced immediate relief; settling the stomach, diminishing the spasms, vomiting, and restlessness, and inducing sleep. Of eleven Europeans, in whom this course was followed, only one died. A second bleeding was seldom requisite; but when

the spasms happened to return, and the pulse kept full and strong, the operation was repeated; always with the same relief. The Natives were, however, seldom seen, until the long continuance of the disease, and languor of the circulation, rendered the lancet a precarious and doubtful remedy. Thus with one gentleman, it was possible to procure blood, only from two, out of a hundred cases.—With another, little benefit followed its employment. Of six Sepoys, who were bled, three died; in one the quantity desired was gained; in two others, from six to ten ounces; and in the remaining three fatal cases, only from three to five ounces. On the other hand, of fifteen Sepoys, who were not bled, only one died. In another Corps six persons were bled. By the aid of warm fomentations to the arm and hand, from ten to twelve ounces were procured, in every instance; and all recovered, but one.—The blood at first flowed slowly, and of a dark purple colour; afterwards it became quite florid. After blood letting, the practice followed was somewhat various. By some, who placed faith in the sedative powers of calomel, that medicine was given alone, in doses of twenty grains placed on the patient's tongue, with a little sugar; and laudanum was abstained from, unless the violence of the retching required its subsidiary aid. With others, it was usual to precede the exhibition of the calomel, by large

draughts and clysters of rice water, to cleanse the stomach and bowels. The calomel was repeated every four, or six hours, till the urgency of the symptoms had completely subsided. This usually took place in twelve or fourteen hours: sometimes not until ptyalism had ensued. After the vomiting and purging were wholly allayed, castor oil and other mild laxatives were used, during several days; to carry off the acrid and foetid evacuations, which invariably appeared at the termination of the attack. When the patient was brought in, at an advanced stage of the disease, or the severity of the attack was such, as at an early period greatly to depress the vital powers, and produce all the symptoms of exhaustion, the anodyne and stimulating plan was very generally followed,—with the same partial success, which attended it in other quarters.

We now come to the Centre Division of the Army, where the disease was seen on the largest scale; and each remedy was brought to the full test of experience, by numerous and repeated trials. Here, therefore, it will be necessary to be somewhat more particular, than we have been, while speaking of the other Corps of the Army.—When the disorder first fell upon the Camp, in so insidious a manner, as to lead to no suspicion of the dreadfully Epidemick form it was soon to assume,

the cases coming under observation were comparatively mild ; and were treated successfully with calomel, opium, and brandy, in moderate doses, at regular periods. But, as the symptoms increased in intensity, this plan frequently failed ; and it became necessary greatly to augment the quantities of these medicines. At length, even the largest doses of stimulants proved useless ; and the miserable sufferers were cut off, in spite of every means, after an hour or two of illness.—The bodies of some of the Dooly bearers, and Native details, were then opened, and such inflammatory appearances discovered, as seemed to warrant a new mode of treatment. The lancet was accordingly had recourse to ; but as, at this period, the patients were almost all Natives, seen at an advanced stage of the disease, and in whom universal coldness and collapse had usually taken place, it was rarely found, that the blood would flow ; and the practice was soon abandoned in despair.—Then, brandy and other cordials were freely given, to raise the pulse, and remove debility ; and large doses of laudanum, to relieve spasm ; but still almost all died.

Whilst the practice was in this unsettled state, and the Medical Officers were in extreme suspense, as to the proper means of resisting the disease, the European portion of the Army began to be attacked. About 5, A. M. of the 14th of No-

vember, two Europeans belonging to the Flank Battalion were admitted into Hospital.—They had the disease in its most violent shape. The spasms especially were tremendous. A scruple of calomel, and 100 drops of laudanum in a glass of brandy and water, were given to each of the sufferers, and repeated at intervals during the day; but without the least relief. They continued in horrible torture; and died before eight at night.— During the course of the same evening, four men of the same Corps were admitted together. It was resolved to try bleeding on all. From two no blood could be obtained; but from the other two it came freely; and as it instantly relieved the patients, thirty ounces were taken from each. Next morning of these men, the two latter were out of danger; whilst of the former, one was dead, and the other expired before noon.—Emboldened by the successful results of this trial, the Medical Officers of the Flank Battalion from this time endeavoured to bleed every one taken ill; and with one solitary exception, no person thereafter died, from whom twenty-four ounces were obtained. If the patients were seen within two or three hours from the beginning of the attack, the practice usually succeeded; but at a later stage, when the pulse was gone, the skin cold, and the nails blue, no means could make the blood flow.— Sometimes, even in the commencement of the attack, the attempt was ineffectual, from the extreme violence of the symptoms.

About the same time, a similar modification of treatment was adopted in the Artillery hospitals: From the ill success, that attended its employment amongst the Native details, venesection was for a few days laid aside. But, as it soon appeared, that all other means were unavailing, it was shortly after again had recourse to among the Europeans; and from that time forward, not a patient was lost, except one from whom only a few ounces of blood could be drawn. Whilst the blood was flowing, the patients generally expressed themselves to be much relieved; the spasms instantly abated in violence, and in many cases, totally disappeared on a second bleeding. Sound sleep frequently ensued; and after a few hours, the patient awoke refreshed, with scarcely an unpleasant feeling remaining. From eighteen to twenty-four ounces were always taken on admission; and the operation was repeated to the same extent, if the spasms did not yield, after an interval of three hours. In some instances, it was had recourse to, even four or five times in twelve hours; the quantity of blood taken away being solely regulated by the symptoms, without attention to the state of the pulse, which was generally weak and frequent. Some of the Europeans lost more than five pounds within twenty-four hours; yet they did not appear to experience a greater degree of debility from this extent of depletion, than those, who had not lost half the quantity.

Moderate bleeding was practised generally in His Majesty's 24th Regiment of Dragoons, and 87th Regiment of Foot ; and with equal success. So, in the Rocket Troop, the practice was to take thirty ounces from each patient. Here, in 27 cases it was successful, with exception of one man from whom not a drop of blood could be drawn, although the veins of both arms were opened.

In the Artillery hospitals, at the same time that a vein was opened, a scruple of calomel was given and repeated every two hours, every hour, and where it was frequently rejected from the excessive vomiting, even every half hour, till the irritability was moderated, or it was evident, that no benefit was to be expected from the medicine. It in many instances appeared to produce the best effects ; but although frequently pushed to the extent just mentioned, and even given in doses of forty grains every half hour, both alone and conjoined with two to four grains of opium, or fifty to a hundred minims of laudanum, from the very commencement of the attack, it so often failed, that it could not be allowed to possess any specific power to allay the irritable, or spasmodick state of the stomach and bowels. It was, however, upon the whole, thought more uniformly successful in alleviating that state, than any other medicine. In some cases, large doses of laudanum in saline draughts succeeded,

when calomel and solid opium had failed; in others, opium gave relief, when calomel alone, or combined with laudanum, had been tried in vain. Wine and brandy were added with the best effects, when great debility had supervened. Anodyne clysters were sometimes beneficial; but no good was perceived to result from anodyne embrocations, or blisters to the Epigastrium. The warm bath could not be fully employed. A mild purgative, given as soon as the state of the stomach would admit of it, was necessary to bring away the large watery discharges, with which the bowels were filled. The vomiting and irritability of stomach in numerous instances kept up many days; and yielded, sometimes to one remedy, sometimes to another. Diluted sulphuric acid was at this period largely given, without effect.

In the Flank Battalion, after bleeding, calomel and opium were administered, and in three or four hours followed up by jalap or castor oil; which produced fæculent stools, and completed the cure. In some cases, it was long before the patient regained his strength. In such as would not bleed, stools were procured with great difficulty; the dangerous state continued several days; and recovery was very tardy. Those, again, in whom the blood flowed freely, rapidly regained health; and generally returned to their duty in three or four days. In the Rocket

Troop, an emetic of ipecacuana, given after bleeding, so as to bring up a quantity of the dirty fluid, and curdled matter, with which the stomach was filled, was thought to do good. Blisters, and effervescent draughts were found very useful in allaying the irritability of stomach, which harassed the patient throughout the whole course of the disorder. In His Majesty's 87th Regiment, calomel given alone, either in large or small doses, always proved hurtful. Combined in small and repeated doses with opium, and aided by turpentine and anodyne clysters, fomentations, and frictions with warm oils and camphorated liniments, it seemed to allay the irritability of the stomach and bowels, and relax the spasms.

The same mode of treatment was generally followed amongst the Natives; with exception of bleeding, which in most cases proved quite inadmissible. In the early periods of the Epidemic, the generality of the Native patients were brought in, either moribund, or in such a state of exhaustion, as to render all attempts at bleeding useless. But, even at a later period, when the Natives, having become sensible of the great danger of delay, applied for assistance soon after the commencement of the attack, venesection was usually impracticable. Whether from the greater violence of the disorder in this quarter, or from the constitution of this class of persons

being more readily depressed, than that of Europeans; the powers of life appeared to be in them almost immediately extinguished, and universal collapse soon took place. An entire stop seemed to be put to the circulation; and the blood wholly forsook the superficial veins. It is plain, that, however large the orifice in such cases, no blood could be expected to flow. It was, accordingly, scarcely in one instance found possible to obtain more than six ounces from a Native labouring under the disorder; and from upwards of a hundred patients, whose veins were opened in the Artillery Hospital, one ounce was most commonly the extent of what could be got. In such cases the strongest stimulants seemed necessary to revive the sinking powers; and all, accordingly, placed their main dependence on powerful and repeated doses of ether, brandy, oil of peppermint, camphor, &c. with laudanum, calomel, blisters and other topical means. That these were often successful, it cannot be doubted; but still they so frequently failed, as to convince the most sensible observers that, bleeding amongst Europeans being alone excepted, but little confidence was to be placed on any mode of treatment hitherto discovered; and that the disease often attacked with such awfully fatal violence, as to baffle all human skill.

The diarrhoeas and fluxes, often consequent on the attack, were here, and in other parts of

the country, found to yield readily to opiates, calomel, ipecacuana, and such mild astringents, as are usually serviceable in the removal of similar complaints, arising from different causes.

Every enquiry into the practice followed by the Natives, in resisting this most formidable disease, has only tended to shew, that wherever they departed from the methods usually pursued by European practitioners, the remedies used by them were either of a frivolous, or of a pernicious nature. In the Moohumudan cities of Upper India, the Native Physicians adhered to the rules laid down by the writers of the Arabian school; and after cleansing the primæ viæ of their noxious secretions, by means of salt and water,\* and mild diluents, had recourse to opium and

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\* This practice was tried very successfully by the Native Doctor with Colonel Skinner's Horse at Shapoor in Rajpootana in the Autumn of 1818. Every man was as soon as taken ill, vomited with salt and water, and then had opiates; and although the Corps was largely affected, not a single death occurred. The practice is thus described in a letter from the Corps. "Warm salt and water is given till the stomach is well cleared; and then small doses of laudanum, and peppermint, or the essence of cardamoms, when the irritability of stomach is stopt. Afterwards, violent thirst comes on, for which boil anise, and when cooled, give it, as often as required by the patient. Great numbers were cured by this method. The Natives of Indore cured great numbers. I may say the only medicine they had, was juice of onions

spices : as cardamoms, and the different sorts of pepper. Sometimes they used preparations of lime, decoctions of the bark of the *Neem* tree, and other powerful astringents. Where, again, the judgment of the medical attendant was warped by some absurd theory, of the malady originating in great internal heat ; he placed his chief dependence on cold drinks, and killed his patient with deluges of rose water and lemonade. And, as if these were not sufficiently speedy in their operation ; he often stripped the sufferer completely naked, and having rubbed his body over with dust of Sandal wood, kept fanning him, until the little heat and life remaining, was extinguished. But, the great mass of the people expressed by their conduct, how fully they were convinced of the inutility of all human aid to subdue the calamity ; for no sooner did the disease appear, than they fled for assistance to their offended deities, and allowed the sufferer to expire amidst their unavailing prayers and incantations. Latterly, however, when they saw their superstitions fail them, men even of the highest castes, throwing off all their religious prejudices, applied to the European practitioners, and learnt to place their faith in the only means, which have been and Bazar arrack. It was also practised at Mow ; and a great number of men were cured in the camps ; but with the salt and water as above, not a single man was lost in this Corps ; and stopping it suddenly, with a large dose of laudanum and calomel, was certain death."

yet found, in any measure, adequate to resist the attack.\*

A deliberate review of the whole of the preceding remarks, on the modes of treatment pursued by different individuals in combating the disease, and a careful comparison of the results of opposite lines of practice in the several Divisions

\* The practice of the Ancients in this disease was very unsettled. Galen tells us, that Asclepiades cured it by pastils made of spikenard, hyoscyamus, aloes, and rue with juice of roses, inspissated in astringent wine; and that Chrisippus and his pupil Erasistratus used purgatives, and wine diluted with cold water. Galen himself gave wine mixed with cold drinks, quinces, pomegranates, and other austere fruits; placed the patient in a cold bath; and largely cupped the abdomen. He sometimes gave mint and cinquefoil, in wine and hot water; but he chiefly placed faith in Theraica, a nostrum compounded of viper's broth, and nearly a hundred simples, with wine, spices, and warm purgatives. (See his treatises *de usu Theraici*; *de compos. Pharmac. de ven. Sect. et de Medicin. facil. parat*). Celsus proceeded upon sounder principles: he first freely used diluents, and then wine, when the crudities were expelled. When the cramp was severe, he administered rue, and applied sinapisms, and cupping instruments to the stomach; and where the extremities got cold, he used hot oils and warm fomentations. He admits, however, that few disorders so obstinately resist every means employed. Avicenna, and the authors of the Arabian school, first vomited the patient; and then gave hot water, vinegar, and oil.

of the Army, would seem to authorise the following conclusions.

1. The disease sometimes attacked with such extreme violence, as from the commencement, apparently to place the sufferer beyond the reach of medical aid, and to render every curative means employed equally unavailing.
2. The difference in the degree of mortality amongst those, who did, and those who did not take medicine, was such, as to leave no doubt, that, when administered in time; and with discrimination, it frequently saved the patient from death.
3. The chances of a patient's receiving benefit from medicine, diminished in proportion with the increased duration of the attack.
4. In Europeans generally, and in robust Natives, bleeding could commonly be practised, where the patient was seen within one, two, or perhaps three hours, from the beginning of the attack; and in all cases, in which it was resorted to, under such favorable circumstances, it was more successful than any other remedy, in cutting short the disease: usually resolving spasm; allaying the irritability of the stomach and bowels; and removing the universal depression, under which the system laboured.

5. Amongst the generality of Natives, the depressing influence of the disease was so powerful, and rapid in its operation, as almost immediately to produce complete collapse, and nearly destroy arterial action ; and therefore, to render venesection, for the most part, from the beginning, impracticable.

6. In such cases the cure was best attempted by diluents, powerful anodynes, and stimulants ; combined with calomel ; and followed up by mild laxatives, and tonics.

7. Although it cannot be affirmed, that calomel possessed any specific power in checking the disorder, it was undoubtedly frequently useful in soothing irritability ; and was perhaps, of more certain sedative operation than any other medicine.

How to apply these deductions to practice, and to vary the different means at our disposal, according to variety in the form and severity of the attacks, will be best learnt from a frequent observance of the disease ; aided by a careful perusal of the Cases attached to the body of this Report,



List of Persons attacked by Cholera Morbus  
 in the town of Calcutta, to whom Medicine  
 was administered, from September to Janu-  
 ary, 1819.

DATES.	Days.	Attached.	Cured.	Convalescent.	Died.
From 19th Sept. to 1st Oct. 1817.	13	3164	2102	984	378
2d Oct. to 14th	13	2916	1991	701	221
15th do. to 28th	13	2012	1498	449	65
28th do. to 9th Nov.....	13	1515	1127	346	42
10th Nov. to 22d	13	1253	883	294	76
23d do. to 5th Dec.....	13	1054	771	224	59
6th Dec. to 19th Dec.....	13	1001	702	240	59
19th do. to 21st do.	13	705	518	157	30
Total	104	18920	9595	3395	980

**List of Patients attacked with Cholera Morbus,  
to whom the Native Doctors, in the Suburbs of  
Calcutta, entertained for that purpose, afford-  
ed relief, from the 19th of September, 1817, to  
the 31st of January 1818, inclusive.**

MONTHS.	Number of Sick attacked with Cho- lera Morbus.	Cured	Died.	Con. & lecent.
From the 19th to the 30th September 1817, .....	2190	1920	248	27
From the 1st to the 31st October,.....	3275	8122	132	21
From the 1st to the 30th November,.....	1597	1554	40	3
From the 1st to the 31st December,.....	1418	1368	46	4
From the 1st to the 31st January, 1818*.....	691	643	46	2
Total	9171	8607	507	57

\* The Native physicians were temporarily discharged during next three weeks.

Report for the same period of Native Villagers,  
 &c. who have applied to the Native Doctors  
 of the Guards at Allipore, Bhowanypore,  
 Soorah, and Russapuglah, those with the My-  
 sore Princes, &c.

MONTHS,	Number of Sick attacked with Cholera Morbus.	Cured.	Died.	Convalescent.
Month of September 1817	547	489	36	22
Ditto October, .....	485	464	14	7
Ditto November, .....	134	157	4	3
Ditto December, .....	162	153	6	3
Ditto January, 1818, ...	65	64	1	.
Total	1423	1327	61	35

List of Patients attacked with Cholera Morbus,  
to whom the Native Doctors in the Suburbs of  
Calcutta entertained for that purpose, afforded  
relief, from the 25th of February to the 15th  
of July, 1818, inclusive.

MONTHS.	Number of sick at- tacked with Cho- lera Morbus.	Cured.	Died.	Convalescent.
From the 25th to the 28th February, 1818,	629	532	73	24
From the 1st to the 31st March, - - - - -	2197	1950	216	81
From the 1st to the 30th April, - - - - -	2187	1958	209	20
From the 1st to the 31st May, - - - - -	1857	1742	97	18
From the 1st to the 30th June, - - - - -	1605	1510	78	17
From the 1st to the 15th July, - - - - -	948	887	46	15
Total	9423	8579	719	125

Report for the same period of Native Villagers, &c. who have applied to the Native Doctors of the Guards at Allipore Bhowanypore, Soofah and Russapuglah, those with the Mysore Princes, &c.

MONTHS.	Number of sick at tached with Cho- lera Morbus.	Cured.	Died.	Convalescence.
Month of February 1818	172	146	11	15
Ditto March, - - -	638	584	42	12
Ditto April, - - -	377	352	20	5
Ditto May, - - -	263	250	10	3
Ditto June, - - -	256	244	6	6
Ditto July, - - -	153	150	2	1.
Total, - - - - -	1859	1726	91	42
Grand Total, - - - - -	21876	20239	1378	259

Abstract of Deaths from the Cholera Morbus,  
 reported to the Magistrates from the princ.  
 pal<sup>l</sup>Burying Grounds, and Ghauts or Ferries,  
 in the Town of Calcutta.

1815*	1816*	1817	1818	1819	Grand Total
January, - - - - -	11	17	8	407	73
February, - - - - -	11	14	13	1324	81
March, - - - - -	6	12	5	1130	203
April, - - - - -	0	8	4	586	266
May, - - - - -	5	0	11	490	187
June, - - - - -	10	5	20	175	87
July, - - - - -	16	6	26	76	34
August, - - - - -	24	10	133	156	36
September, - - - - -	37	21	468	132	57
October, - - - - -	25	29	259	145	86
November, - - - - -	26	10	186	373	349
December, - - - - -	11	9	190	115	0
Total, - - - - -	182	141	1823	5109	14598214

\* These two years shew only the number of Hindoos reported to have died of the Cholera Morbus; the three following of both Hindoos, and Mussulmen.

**RETURN of Casualties in the Centre  
Division Grand Army from the disease  
lately prevalent, up to November 30, 1817.**

Brigades.		CORFs.		Europes. N. Soldiers		Public Establishment.	
1st Bt. Inf.	H. M. 37th Regt.	875	3	1,35	Nature Officers.	Frank and File.	154.
2d Bn.	25th Regt.	558	...	...	Frank and File.	Frank and File.	154.
1st Bn.	29th do.	387	...	1	31	...	154.
2d Bn.	1st do. ...	920	...	1	2	50	...
2d Ditto.	Flank Bttn. ...	703	6	42	...	...	8
1st Bttn.	8th do	938	...	...	1	29	...
2d Bttn.	11th do	935	...	...	1	41	...
1st Bn.	24th do.	938	...	...	1	2	42
3d Ditto.	Horse Artillery.	335	1	12	...	...	4
	Rocket Artillery,	98	5	...	...	2	...
	Foot Artillery,	270	...	1	...	1	...
	Miners, .....	130	1	...	...	11	...
	Pioneers, .....	390	...	...	...	8	...
Total	.....	8531	14	198	3	5	247
Grand Total.....	.....	8531	113	50	22	11	153

N. B.—This is exclusive of the Corps which formed Colonel Philpot's Detachment, viz. H. M. 24th Dragoons, 676 strong, the 3d Regt., N. C. 716 strong; the Dromedary Corps 296 strong; the 2d Troop Horse Artillery, and the 2d Batt. 13th Regt. N. I. 900 strong; and of the 7th Regt. N. C. 680 strong.

**CASUALTIES** in His Majesty's 24th Light Dragoons, 87th Foot, and Flank Battalion, from the 25th October, 1817, to the 25th January, 1818.

N. B.—The above are Deaths in *His Majesty's Corps alone* in the Grand, or Centre Division of the Army. The Casualties in the months of November in only 3 Corps are immense: viz. 5 Officers, and 143 Rank and File, which marks the period of the Cholera.

## APPENDIX.

### CASES OF CHOLERA.

NONE of the following cases were drawn up with a view to publication. In most of them, the symptoms were, amid the hurry, and busy occupation of a very sickly period, noted down at the patient's bedside, more to serve as memoranda to the medical attendant, than for any other purpose. Hence they are not so full or elaborate, as they might have been made under other circumstances. It is to be regretted, that no cases have been received from the Centre Division of the Army, in which the disease was so extremely formidable. But, there every man's hands were so full of business, that far from having leisure to write down the diseased appearances of the sick, he found it impossible even to pay the requisite attention to the numerous calls on his humanity. The usual journals were, accordingly, for a time entirely closed. Most of the instances among Europeans, given below, occurred in the General Hospital of Calcutta, in the shipping in the river, and at Cawnpore. The Native cases, with hardly any exception, happened partly at Delhi, and partly with the Nagpore Division of the Army. Many others might be added; but as in all, the symptoms were nearly alike, it is thought needless further to increase the size of a Report, already perhaps too greatly prolonged.

#### CASE FIRST.

GENERAL HOSPITAL, 5TH SEPTEMBER, 1817.

Corporal Clayton, His Majesty's 59th Regiment; admitted into Hospital about three o'clock P. M. Was

taken ill at 7 in the morning, with swelling of the belly, sickness at stomach, vomiting, purging, and cramps of the legs, stomach, and belly. Was greatly purged—knew no cause of his illness. On admission, his body was covered with cold sweats; the vomiting incessant; cramps very severe; pulse scarcely to be felt; countenance very heavy and pale. Laudanum was rejected. Calomel, opium, and every thing swallowed, came up. A Blister to the pit of the stomach; small doses of calomel and opium, frequently repeated; frictions to the surface; mineral wine; all seemed to be of little service. The pulse sunk; the extremities became cold; hiccup ensued; and he died at 3 next morning.

*Dissection*—On opening the abdomen, the inner surface of the stomach, from the cardia to the pylorus, was found inflamed, red, covered with slimy, bloody, greenish matter; in some parts slightly abraded. The marks of inflammation were strongest towards the pylorus. The duodenum was in the same state; of reddish colour, and covered with bloody mucus; but, little thickened. The liver was sound, and full of blood; the gall bladder contained about two ounces ofropy, dark green bile. The colon was distended with air to a great size; most of the intestines externally had a reddish tinge.

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## CASE SECOND.

26TH FEBRUARY, 1818.

John Donnochan, seaman, active; good constitution. After being much in the sun, was today suddenly seized with giddiness, then spasm in the body, thighs and arms; followed by looseness, vomiting, cold shivering, and insensibility. Admitted at midnight with severe vomiting and purging, spasms and cold skin. Pulse quick and weak. Is exceedingly thirsty. Has pain of right

side and some tendency to delirium. V. S. ad lb. 1 Hab opii griss calomel gr. xii stat. Appl. Empl. vesicat magn. abdom. *Adhib.* Baln calid.—27th. No relief from the bleeding. Blood flowed easily ; constant vomiting during the night; had several stools like pure rice water. Very thirsty; tongue furred; no cramp; pulse very feeble and weak. Capt. Mistur. salin ʒii aether vitriol gtt. xxx. Tinct. opii. gtt. L. Spir. Lavend. Compt 3ʃs. duab. hor: —3 P. M. Four stools ; perfectly pale ; vomited a little. Thirst excessive ; skin cold ; pulse still feeble. Is rather lower. Hab calomel gr. xx et rep. ad vesper. Repr. Baln. calid.—28th. Slept well; had no stool; vomiting lessened; no cramp ; pulse fuller ; skin now warm ; tongue foul. Hab. Infus. Sennæ ad plen. resolut. alv.—P. M. vomited once. Five light rice water stools; skin warm ; pulse sharp and quick ; feels low ; but appears better. Repr. pil e calomel. —March 1st. Slept well. Three stools of rather a dark colour; no retching or cramp; now very thirsty, with nausea, hot skin full, rather quick pulse; and tongue furred white. Repr. mist. Senn.—P. M. Three light coloured motions; vomited twice ; considerable fever.—Repr. calomel. March 2d. Many natural, watery, frothy motions ; pulse full, and more moderate ; tongue less furred ; skin warm ; no vomiting.—Feels great oppression at his heart ; and sickness of stomach. Is dull. Repr. mist.—P. M. Seven or eight watery, brownish motions ; pulse quicker; not so full. Vomited several times. Repr. calomel.—3d. Two natural motions. Still a little feverish ; feels very low.—To have wine and sago.—P. M. Several dark motions ; in other respects as in the morning. Repr. pil.—4th. Going on well. Four or five brown stools. Still sick. Pulse good.—P. M. Three dark stools ; pulse sharp ; feels low. Repr. calomel.—5th. Much purging of very dark bile.—Stomach lighter ; but still a little vomiting ; pulse full and quick ; skin hot ; great thirst ; tongue cleaner. Repr. calom.—6th. Only one scanty, more faeculent motion. A little squeamish.

Pulse of less volume. Repr. calom.—7th. No stool since yesterday. Is low; with considerable heat, sharpness and celerity of pulse, and sickness. Repr. mist. Senn.—P. M. Mouth sore. Three or four, more natural stools; feels much better.—Omr. pil s.—Passing much dark matter; continues lighter.—9th. Bowels discharged freely yesterday; still a little hot, with white tongue; appetite returning. Sum. Decqct. cinchon.  $\frac{3}{4}$  11 quater indie.—10th. Bowels free; stools natural. Convalescent.

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### CASE THIRD.

MARCH 2D, 10 $\frac{1}{2}$  A. M.

Thomas Hughes, Seaman, about 30 years of age, constitution debilitated by previous disease; was attacked a quarter of an hour ago, with vomiting, retching, severe purging, with frequent dark watery stools. Spasms universal; and particularly severe in the extremities; the muscles of which are incessantly quivering; the whole body is cold and clammy; skin discoloured of a blue purple colour; no pulse to be felt; tongue white; breathing very uneasy; eyes heavy and dull; is speechless, and apparently in great agony; hands shrivelled; fingers twisted—V. S. statim—Tinet. opii gtt. lxxx. Ether Sulphur 3ss stat. Baln. tepid.—1 P. M. Very little blood could be got to flow; although several veins were opened in each arm. Has been in the bath for nearly three hours; spasms greatly relieved, whilst he remained in the water; but recurred, the moment it was attempted to remove him from it, at which time the general convulsions grew so violent, that it required several persons to hold him. During the time he remained in the bath he vomited eight or nine times; rejecting the laudanum, ether, and brandy which were given to him largely at intervals, and a little water and phlegm.

Passed several stools in the bath. Calomel gr. viij opii griss stat.—5 P. M. Vomited once on taking the pill. Breast and back a little warm; extremities cold; has been very restless; but is now lying quiet, taking no notice of any thing; no stool; pulse quite indistinguishable; has been taking hot brandy and water, and frequently using every subsidiary internal and external means of excitement. Repr. haust e Æther et Tinct. opii. Died a few minutes afterwards.

*Dissection.*—On opening the body the intestines were discovered to be of a deep rose colour. The stomach externally, had a natural appearance: internally, its whole surface was covered with coaguable lymph; on removing which, bloody gelatine was found laid on the inner coat, in ridges of elevated streaks. The liver was of a dark blue colour, and very much gorged with blood. The diaphragm, and inner parietes of the abdomen, were blue from venous distension. The vena cava was greatly distended. Nothing else particular in the abdomen or thorax. On taking off the skull cap, a considerable quantity of coagulable lymph was seen on the surface of the brain. The ventricles were completely filled with water, which was likewise found in quantity at the base of the skull, and top of the vertebral canal. This man, during several days preceding the attack, had been exposing himself much to the sun. On the night before the attack, he had pain of stomach, and was purged. The appearances in the brain were probably accidental; as he formerly had had a paralytick stroke, from which he never perfectly recovered.

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## CASE FOURTH.

2D MARCH.

John Smith, Seaman, aged 22, of good constitution.

9 A. M. Has had Cholera since last night. Pulse now very small; severe cramp, with frequent severe vomiting and purging; skin cold; tongue furred white; face pale and anxious. V. S. ad libj. Capt.  $\text{\AA}$ ether Vitr. 3s Tinct. opii g. L. Hab. Bals. calid.—H. 9 $\frac{1}{2}$ . Was bled to fainting. The pain and spasms were relieved; but the pulse did not rise. The  $\text{\AA}$ ether and laudanum are repeated every ten minutes. Says he was taken ill about nine o'clock last night; first with looseness, then vomiting and universal spasm.—First vomited what he had ate; then pure water; stools quite watery. Had severe cramp of the chest and stomach frequently during the night, and great thirst.—9 $\frac{1}{2}$ . One small watery dark motion—again cramped. Pulse very small and quick; skin still cold; face blue. Bath did no good; had spasm immediately after being in it. Repr.  $\text{\AA}$ ether. Capt. calomel. gr. xx adhib. fot. ad abdom.—10. Not so sick now. Pulse quicker, and rather less feeble; skin more natural.—12. Severe cramp of hands and feet; pulse more natural; skin warm; colour returning; no stool or vomiting. Repr. Tinct. Opii et  $\text{\AA}$ ether. Conr. fatus.—1 P. M. Vomited his medicine, with much watery fluid. Appr. Empl. vesicat. magn. ad region. ventri. Repr. Tinct. et  $\text{\AA}$ ether.—3 P. M. No further vomiting; several stools like muddy water. Pulse better, still universally cramped. Conr.—7 P. M. Easier in every respect. Very slight spasms. Stools pass away in very small quantity, nearly involuntarily; and are quite muddy; pulse and skin quite natural. Rep. calom.—3d March. Slept well; no cramp; many muddy stools; pulse moderate; face natural; skin moist. Very thirsty.—P. M. Passed much muddy water; very sick at stomach all day; but did not vomit; pulse and skin natural.—Repr. Calom. Blister rose well.—4th March. Urine made with difficulty; some straining; no high action; pulse, skin, and bodily appearance natural; no stool; tongue very foul. Mist. Senn ad sol. Alv.—Fot. ad pelv.—P. M. stools have not been passed freely.—5th March. Much strained dur-

ing the night; and has passed a great deal of dark thin bilious matter. No vomiting; has a feeling of tightness in his breast and abdomen; pulse and skin natural. Repr. Infus. Senn.—Sago. Wine.—3 P. M. Stomach bad; vomited once on taking the medicine; stools watery, and dark green; pulse good. Calomel 31 h.s.—6th March. Passed a tolerable night; several dark stools; complains much of constriction of chest and abdomen. Repr. Cal. P. M. Sick all day; has ate nothing; no stool; no fever; tongue not very foul. Repr. Calom.—7th March. Still sick at stomach, with severe twitches in the feet—otherwise much as yesterday; stools dark. Cap.  $\text{\AA}$ ther. S. gtt. xxxv Sp. Lavend. C. 3s mist. Camphor. 3ss tern. hor.—P. M. Mouth tender. Easier. Omr. Pil.—8th March. Going on well; sickness gone; motions yet dark. Conr. haust.—9th March. Mouth, face, ears, and throat sore; stomach still feels constricted; stools getting natural—Omr. medicam—Hab. gargar. Commun.—10th March. Only one stool; looks clear and well; and only complains of his blister. Hab. Decoct. Cinchon. 3ii saepe. Food diet.—11th March. Still has constriction of breast; tongue clean; stomach good; bowels open. Conr.—18th March. Complains of pain of bowels and looseness; tongue foul. Hab. mist. cretae. saepe.—20th March. Was last night seized with vomiting, and purging; and is still sick.—An abscess has formed where he was bled in the arm. Adde singul. dos. mist. confection. Opist grl x, et capt. 3ii quater in die.—21st March. Looseness stopt; no complaints. Milk.—22nd March. Still a little purged with griping. Arm quite easy.—24th. Bowels yet irregular with tenesmus. Cap Ol. Ricin. 3s.—26th. Five or six stools with tenesmus.—27th. Bowels painful and costive. Repr. Ol.—30th. Discharged well.—April 7th. Returned last night with irregular action of bowels; purging; and pain as if the guts were knotted; weakness; and want of appetite. Ordered tonicks and strigents.—8th. A good deal purged last night; stools sli.

my.—9th. Only one stool.—Had cramp in left leg yesterday.—10th. Was purged, with griping and numbness of limbs. Utr. Mist. Cretac.—15th. Bowels yet a little loose. Complains of pain, or rather oppression of stomach. 22d. Discharged well.—This man before being attacked had been much exposed to the sun, whilst at work on board ship in the river.

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### CASE FIFTH.

5TH MARCH.

Joseph Jerams, aged 43, a hale, powerful man. Has been sick at stomach, with headach, and disposition to cramp since last night; pulse good; tongue clean. Belly open. Capt. calomel. 91 opii gr 1.—6th March. Sweated much in the night. Had three stools with pain of bowels and flatulence—Habt mist. Senn—P. M. six green motions. Is qualmish with griping—Repr. pil—7th March. griping and purging considerable.—12th Discharged well.—14th. About half an hour before 9 A. M., returned with cold skin, covered with clammy sweat; livid countenance; quick, very small, feeble, fluttering, pulse; sickness; oppression and pain across the Epigastrick region and loins; foul furred tongue; loose bowel; laborious breathing; and cramp upon moving. Immediately took half a dram of ether and fifty drops of laudanum. Gave the following account of himself—Remained well till yesterday, when he was very hard worked in the hold of his ship. At one this morning, was seized with violent purging, succeeded by vomiting of yellow fluid; and then by cramps of the legs, hands, and trunk: all within an hour. Has since been very frequently purged; and has vomited a dozen of times—Motions a thin, mealy looking fluid. Ascribes his illness to drinking bad arrack; but only in moderation—

Has had one stool since he came in.—Repr. Æther. et Tinct. Opii. Appr. Empl. Epispast. ventricul. Hab. Baln. Calid.—9½ A. M. a little relieved by the bath; cramp confined to the toes and fingers, which are stiffened and irregularly twisted.—Stomach-sore on being touched; belly not hard; eyes glassy; features collapsed; very sick and faint; with hurried respiration. Has been in the bath twenty minutes; pulse 144; scarcely discernible; evidently smaller since he went into the hot water; is extremely thirsty; hot bottles are put to his feet and hands; he is allowed to mitigate his thirst by a mixture of sweet spirits of nitre and water.—11 A. M. Vomited a little once; one stool, like seethings of oatmeal; severe spasms of the hands and feet; respiration caught by pain of stomach; skin keeps perfectly cold.—Pulse distinct, feeble and irregular; sometimes very quick, then slow for one or two beats. Repr. Tinct. Opii. et caet.—3 P. M. Confused and delirious—Body quite cold; pulse imperceptible; breathing short and hurried; face much collapsed; no vomiting; several stools as before; has had several touches of spasm. Is ordered to take capsicum with other powerful stimulants; and camphorated spirit externally.—5 P. M. Is sinking; No stool or vomiting; keeps cold without pulse; is sunk in the bed; breathing laborious; face very anxious; incapable of speaking.—6 P. M. dead.

*Dissection.*—The intestines here and there flushed, as if from increased arterial action; and, together with the stomach, filled with a fluid like that passed off by stool. A very small number of red, mottled spots in the stomach; more numerous in the duodenum; gall-bladder full of thin dark bile.—All else healthy in the abdomen and thorax. In the brain, the sinuses, and veins leading to them gorged with black blood.

## CASE SIXTH.

30TH JANUARY.

Private Emerson, His Majesty's 59th Regiment.—About one o'clock P. M. seized with purging, vomiting, great anxiety, and pain of stomach, and spasms in his limbs. By mistake he was not reported till between five and six, when he got a dose of laudanum, and was ordered into Hospital. On admission, the vomiting and purging had ceased; the spasms had nearly gone off; but the pain below the pit of the stomach, and most distressing anxiety, continued; the countenance was pale; the eyes heavy, red and inflamed; the pulse weak; the arms and hands moist, and much below the natural temperature; and the thirst dreadfully urgent—He took a scruple of calomel; and at 10<sup>o</sup> o'clock was bled to 14 ounces; more blood could not be procured.—After bleeding the pulse was more frequent and weak; the anxiety continued.—A little before 11, he was put into the bath—He said he felt easier; and the pulse rose a little.—A blister was ordered for the pained part of the abdomen; and at 2 o'clock A. M. another scruple of calomel was given to him. He slept a little after coming out of the bath. In the morning, the symptoms were much the same; the pain and fullness of abdomen continued, with restlessness; the pulse was very feeble; and the skin cold. He took another scruple of calomel, and had a purgative injection which operated.—The blister had risen partially. He died at one, P. M. exactly twenty-four hours from the time of his being taken ill.

*Dissection.*—On opening the abdomen, the viscera had a general red appearance. The omentum contained little fat, but its blood vessels were distended. The stomach was found inflamed internally; being of a dusky red colour, and covered with reddish mucus. In some

parts the villous coat was abraded. The inflammation was greatest towards the pylorus. There was no thickening throughout, nor even a single corrugation to be seen. The under part near the pylorus was of a dirty brown colour; some of the calomel was discovered adhering to the stomach; as it were, imbedded in the mucus. There was no bile in the stomach, but about a pint of thin watery fluid: probably what he had drank. In the abdomen bilious matter of very pale yellow colour was found.—The duodenum exhibited no marks of disease.—The small and large intestines were of a preternaturally red appearance. The spleen was much enlarged, weighing upwards of two pounds. The liver was of the natural size; colour that of brown nankeen; structure hard and firm, cutting like new cheese; containing very little blood; surface rough and covered with inequalities or small tubercles about the size of peas; the lower edge of dark colour, bent in, and appearing as if it had adhered to the neighbouring parts; the whole internal substance of the viscus of a light pink colour.—The gall bladder shrivelled, and containing about half an ounce of dark green bile.

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### CASE SEVENTH.

MARCH.

Humphrey Blackburn, Seaman, aet. 26th, at eleven to day, from being in perfect health, was suddenly seized with trembling and weakness, followed by sickness, vomiting, and purging of clear watery fluid; was purged nine times. The cramp then ensued; first in his feet, and afterwards in his thighs;—now, at three o'clock, has great pain in the abdomen; spasms in the extremities; thirst; sickness; and looseness; face blue; skin cold, and covered with clammy sweat; pulse gone at the wrists. He is ordered to take a dram of æther and fifty

drops of laudanum every ten minutes. Heat to be applied in every form to the surface.—3 $\frac{1}{2}$ . The cramp of his thighs exceedingly severe; extreme thirst; great anguish; whole body blue and cold.—3 $\frac{1}{2}$ . Pulse now returning; feels much easier.—5. One stool of muddy water; face very blue; hands deadly cold; Pulse very feeble and rapid; anxiety subsists; spasms return on his being moved.—Has taken one dose only of the medicine since last report.—Appr. Empl. vesicat. magn. abdomen. Adhr. Baln. Calid.—10. Still very low, with extremely quick, feeble pulse; great oppression and thirst; no stool.—One slight fit of vomiting; skin cold.—Bath gave temporary relief, but weakened him much; and the spasms returned immediately upon his leaving it. Capt. Calomel 91 st. Sum Sp. Lavend. C. 3fs Æther. vitriol. gtt. xxx, in mist. camphor. 3ifs duab. hor. Hot brandy and water—Dry fomentations.—6th March. Slept a little; had very little vomiting; two watery stools, slightly mixed with faeces; still oppressed, with feeble pulse and coldish skin; tongue loaded with fur. Repr. Calom. et caet.—P. M. Three muddy stools; no vomiting, nor cramp; much hiccup; pulse nearly natural; but feeble; skin coldish—Repr.—7th March. Some scanty, dark green motions; no spasms or vomiting; hiccup severe; pulse and skin natural; T. deeply furred, cream white—Conr.—P. M. Once very sick to-day; now easier; three dark stools.—Repr.—8th March. Had hiccup all night; passed very little by stool; still sick at stomach; pulse moderate; tongue very foul—Conr.—P. M. Sick all day without vomiting; much hiccup; no stool; pulse tolerably good—9th March. Slept ill from feeling cold; had no stool, vomiting, or pain; pulse rather feeble; skin warm; tongue keeps foul; much hiccup. Sum. Mist. Senn. ad. resolut. vent.—P. M. No change since morning; four foetid stools, black and pitchy; no

fever. Repr. Calom.—10th March. Still sick at stomach with chilliness; stools dark; hiccup severe; pulse tolerably good. Hab. viv. calid. pauxill.—P. M. Only one motion; no vomiting; pulse full; skin warm; face red; tongue dark; hiccup continued. Has taken a little nourishment. Repr. calom: 11th March. Still sick at stomach, and labouring under great oppression with constant moaning; tongue cleaner; pulse and face natural; hiccup diminished; stools quite black. Repr. Mist. Senn.—P. M. Many pitchy stools; In other respects as in the morning. Repr. Calomel. 12th March. Passing immense quantities of dark liquid matter; much oppressed, but thinks himself rather easier; pulse natural. Repr. Mist.—P. M. Much worse since morning; low, oppressed, and nearly insensible; breathing laborious, with long inspirations; heat natural; skin moist; pulse slow, not feeble; tongue and teeth black; no stool; has not taken more senna. Died at 5 A. M.

*Dissection.*—Stomach containing a light watery fluid, and slightly streaked; gall bladder full of dark bile, and intestines lined with it; left ventricle of the heart turgid—all else healthy.

## CASE EIGHTH.

17TH MARCH.

John Blackney, seaman, aged 25. On the first of the month admitted with severe symptoms of scurvy; from which he progressively recovered under the usual remedies, until the 14th, when he was seized with pain of bowels and looseness, which continued till the 17th, when he was attacked at ten P. M. with severe spasms and vomiting, cold sweats, feeble indistinct pulse, and the other common symptoms of Cholera—At midnight he

was exceedingly low and weak ; his skin was damp and cold ; he had no pulse ; but frequent vomiting and stools ; and severe pains of knees and cramp of lizzos. He died at day break—Upon dissection no diseased appearance whatever could be discovered.

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### CASE NINTH.

20TH MARCH.

Dr. L. aged 46, of sickly spare habit, in the evening felt himself a little unwell. At two of the following morning he took a dose of purgative salts; they operated about six; at seven he went out to take his usual ride; he soon returned, and was immediately seized with vomiting and purging of clear fluid, cold extremities, loss of pulse, blue countenance, oppression and cramp of hands, and feet. Laudanum, brandy, hot frictions, and the warm bath were severally used without effect, and he died at half past two, after suffering great pain from spasm.—He was relieved whilst in the bath; but one of his attendants thought him weaker on leaving it.—He was opened next morning; the stomach especially, and the guts were found relaxed and distended from loss of tone—In the stomach was a large quantity of light coloured fluid, mixed with small pieces of potatoe and undigested food—no redness or appearance of inflammation through the whole extent of the alimentary canal. Liver natural; gall bladder flaccid; and containing only a little pale coloured bile.

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### CASE TENTH.

19TH MAY.

Private Black, His Majesty's 59th Regiment, was seized at four this morning with vomiting, which was

soon followed by pain and giddiness of head, and great thirst. On admission into Hospital at 11 o'clock, he complained much of headache and giddiness, sickness, and spasms in the legs. His countenance was altered; his eyes sunk; colour of body bluish; respiration hurried; pulse quick and contracted; skin covered with sweat. Cold water was thrown over him; he was rubbed dry, put to bed; and took a little warm rice-water and wine. Soon after, a scruplo of calomel was given, and the temporal artery was opened.—About five ounces of blood were taken away.—The pulse sunk; the extremities became cold; the breathing more hurried; every thing swallowed was instantly rejected; and he died at 12 P. M.

*Dissection.* His body was opened about ten hours afterwards—The omentum was loaded with fat, and of reddish colour; the stomach much inflamed, thickened, and of red colour; the lower part of the oesophagus and upper portion of the duodenum in the same state. The other abdominal viscera were sound, except that their vessels seemed to contain more blood than usual. The dura mater was reddish; and its vessels loaded with blood; in one place there was slight extravasation. The lateral ventricles were full of water.

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## CASE ELEVENTH:

### CALCUTTA.

21st April, 1819. Mr. R. M. Assistant Surgeon, set 28, a stout muscular man.—Has been for several days past going about Calcutta, and backwards and forwards between Calcutta and the General Hospital, in a Palan-queen. On the 18th and 19th instant, was constipated in his bowels, but general health good, and spirits high, especially on the evening of the 19th; and it is ascertain-

ed that he had committed no excess in eating or drinking. On the morning of the 20th his bowels became loose without any assistance from medicine; and he had early several free stools. About 10 A. M. he was again purged, and at the same time vomited freely: and expressed himself much relieved by these evacuations.—He felt himself so easy after this, that he got into his Palan-queen, and went from the General Hospital into town.—On reaching Cossitollah Street he felt languid and thirsty; and he there drank a glass of water.—Feeling himself uneasy he returned to the Hospital before 12 o'clock, and he was purged very severely.—About 2 P. M. he sent for Dr. —— from the Hospital, and said that he had had about 20 stools since returning to the Hospital, copious and watery, but passed without pain; that he felt very weak and excessively thirsty, but he had no pain in his stomach or abdomen, and no spasms of any kind or in any part of him.—He also had vomited at several times a quantity of liquid matter of no bad taste, which came away without pain or much retching; and seemed to be brought up more by a voluntary effort than by the throat of the stomach. He said he had taken a cup of tea about 20 minutes before this time, which was retained.—An injection of an ounce of olive oil and two drachms of laudanum was ordered, but he objected to this as being troublesome.—He was then given a tea spoonful and a half of laudanum without any admixture; and he was allowed to wash his mouth with a little tea, of which he did not swallow any. In a few minutes the laudanum was rejected, along with some of the tea he had taken before it. A mouthful of hot water was then given him, and he vomited up a considerable quantity of liquid of a whitish colour, or rather limpid. He then drank nearly a tumbler of hot water, which remained quietly on his stomach. Till this time his pulse was perceptible, but very weak; and his eyes were much sunk; and the whole

Hollow of the orbits almost black ; other features shrank and sharp ; body and limbs covered with cold and excessively copious perspiration. He had another stool, liquid, but not copious ; after which he said his strength was gone ; pulse now sunk entirely ; and the spasms seized his limbs while getting into bed.---An anodyne injection of 3 i. ol. oliv. c. Tinct opii. 3ij. was then ordered ; and another medical man coming in, gave him about a drachm of laudanum, which was retained. Injection was administered and retained ; but spasms became severe and more frequent. About 4 P. M. he passed the injection with some fluid matter ; but stomach remained easy : spasms however continued, and now extended to upper part of the thighs ; and along the abdomen. He had the injection repeated, and a few spoonfuls of sago and brandy as hot as it could be administered, given him, and this last was to be repeated every half hour. In course of next hour some other medical men came, and gave him some compound spirit of ammonia in a little brandy ; this immediately rejected, tho' the stomach had been perfectly quiet since taking the hot water ; and had retained the sago and brandy ; of which he had taken a little several times. He then had a purging injection administered, which operated immediately, and pretty copiously. Many medical men were now on the spot ; but patient's strength seemed entirely gone ; spasms still severe, extending from toes to the pit of the stomach ; much tossing and restlessness ; very copious perspiration, but now considerable heat had returned to the forehead, on which the perspiration was warm ; but that on the body and limbs was cold and clammy. The sago and brandy were continued at very short intervals, and in small quantities, and hot water in bottles applied to the feet and stomach ; no more stools and no more vomiting occurred ; but spasms and restlessness continued. About half past 8 o'clock he complained that deglutition

had become difficult; some brandy and water was substituted for the sago and brandy; but the patient gradually sunk; till he expired at 20 minutes before ten o'clock.

On examining the body about 10 hours after death, the extremities of the body were cold, livid, and stiff; but a considerable degree of heat was perceptible on the integuments of the abdomen; and internally the heat was higher. On laying open the abdomen, the omentum was found very thin for a man of his habit of body; and excessively vascular, and of a pretty bright red colour. The whole tract of small intestines was very red and florid; and the mesenteric veins turgid, being loaded with dark coloured blood. Large intestines perfectly healthy, and natural in colour. The whole external surface of the stomach extremely vascular, and the veins turgid with dark blood. Liver for the greater part natural in colour, but one point of right lobe found adhering to the side so firmly, that the substance of the liver was torn in attempting to bring the liver forward; and at this point it appeared gorged with blood; but the substance was quite soft when cut into; lower margin of left lobe where in contact with the stomach somewhat gorged, and colour a little darker than in other parts. Gall bladder moderately distended with bile of usual fluidity, but of a deep olive colour. Spleen quite natural; urinary bladder empty and shrunk; pericardium and heart quite natural; right lung adhering very firmly to the sternum.

On opening the stomach, about one pound and a half of blood, mixed with a little bile, discoverable by the smell, was found in its cavity. The whole venous system of internal surface exceedingly turgid and loaded with black blood, except in a spot of about 4 inches by 3 immediately below the cardia, where the veins were entirely empty, and a spot was discovered where

the vein had given way, and the blood in the adjoining vessels had made its escape. The whole tract of intestines empty ; and when any parts of alimentary or foeculent matter were found, they were quite natural. Inflammation on internal surface of small intestines not so strongly marked as on the external.

### CASE TWELFTH.

A. B. aged 40 ; healthy, and of a remarkably strong and robust frame of body ; after dining and eating a quantity of vegetables and pickles, travelled to Calcutta a distance of 30 miles on the evening of the 11th November 1819. The weather was cold, raw, and very unpleasant ; with overcast sky, and north-westerly wind. After again eating pickles, he went to bed. About 20 minutes after 1 a. m. he was roused by a severe shock of an earthquake, and inconsiderately exposed himself in his night-dress in an open veranda to the damp night air. He then felt, that he had caught cold in his bowels ; and in the course of the morning, that is, between day light and half past ten, had eight loose, watery motions, with soreness of the abdomen, and sickness of stomach : short, however, of vomiting. Between 9 and 10 a. m. the symptoms were aggravated ; he now vomited once ; the cold symptoms came on, with prostration of strength, diminution of arterial action, and threatenings of spasm. Between 10 and 11 he was seized with cramp in the toes. He was now seen for the first time by his medical attendants. All the signs of collapse were then strong upon him ; the cold clammy blue surface, shrunk features, shrivelled skin, pearly eyes, anxiety, thirst, and small hurried pulse. The vomiting and purging had ceased ; and from this time forward, there was no discharge from the bowels, excepting a small quantity of fluid passed off by the anus,

and so perfectly transparent that it did not in the least discolour the sheet underneath. The tongue was foul, but moist. The mind was firm and unclouded as in perfect health. The spasms were yet confined to the toes, and lower part of the feet. Hot brandy and water was immediately given to him, as often, and in as large quantities, as the stomach would bear. Hot bottles were put to his lower extremities; he was covered with blankets, and constantly rubbed all over. His arm was instantly tied up, and blood drawn by a large orifice. This was a little before eleven. The operation was again repeated a little after twelve. The blood at first came quite freely; but afterwards slackened, as the exhaustion and feebleness of pulse increased. Latterly, it came with great difficulty, and only in little jets or drops, as it was urged along the veins by the hands of the assistants. In all about forty ounces were procured. Further endeavour was then given up as entirely useless. Shortly after the first vein was opened, he took ten grains of calomel, and one of opium. Meanwhile, the symptoms were rapidly running on. The spasms, which for a time seemed to yield to the first bleeding, returned to the feet; and seized the wrists and fingers.—The pulse sunk, so as scarce to be perceptible. The thirst, anguish, and restlessness were intolerable. The cold sweat ran in streams from the forehead and temples; the patient could not rest a moment in one place; and as the smallest motion produced a renewal of the cramps, his sufferings were cruelly aggravated by every change of posture. The most singular feature in this case, was the regular succession and rise of the spasms. From midday, when they had reached the calves of the legs, they gradually ascended, by regular attacks coming on at intervals of ten minutes or a quarter of an hour, first to the thighs, and hips, then to the muscles of the belly and back, and lastly to

the diaphragm and praecordia. As they seized the psoæ muscles, they were distinctly seen to raise the pelvis and thighs. The abdomen was now hard and swelled. When the spasms had reached the trunk and diaphragm, they produced hiccup and excruciating pain in the chest, back, and loins; with a feeling as if a sharp instrument were striking through the breast. Nothing could be more affecting than to hear the patient accurately describe their progressive rise; exclaiming, in the midst of torment, "that now they had got to his thighs, then to his back, then to his chest :" Last of all, that "they had reached the heart, and all would soon be over." This scene of agony lasted till about two o'clock; after which there was little else than a last expiring struggle for life.—All pulse was now gone; the motion of the heart scarcely to be felt; as the circulation stopt, water began to collect in the air cells of the lungs, and partial suffocation was evinced by deep moans, and long drawn, broken inspirations. The mind, which from the beginning had been remarkably clear and composed, now became clouded. The patient became blind and talked incoherently; but these symptoms might perhaps be ascribed to stupor caused by the large quantities of laudanum and brandy given to him in the hopes of checking the disease. Finally, he sunk about 3 P. M. exactly five hours from the first appearance of the decided symptoms of the attack. The body was not examined.

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## CASE THIRTEENTH.

NEW ANCHORAGE.

NOVEMBER 4TH, 1817.

George Faith, Seaman H. C. S. Carnatic, a stout, healthy man, at 9 o'clock last night was attacked with severe vomiting and purging of a fluid quite transparent, accompanied with griping, and soon after followed by

spasms over the trunk and extremities, but particularly in the muscles of the calves of the legs; the pulse was small and intermitting.

Large draughts of tepid water were given and repeated until the vomiting ceased. To allay the spasmotic action 40 drops of the tincture of opium were given; this not having the desired effect, the dose was repeated with the addition of 3ij vitriolic Æther. This allayed them for a short time; but they returned. The dose was again repeated in 3ijj of Hollands; but without effect. The patient was then taken out of his hammock, and had three buckets of cold water dashed over him; he was then dried, and put in again. This, together with friction over the abdomen, relieved the spasms for a term; but they again made their appearance; griss of opium was now given, and repeated in an hour; from this he seemed to obtain much relief. At 12 o'clock he again became considerably worse, accompanied with difficulty of breathing; pulse scarcely perceptible; lips of a livid colour; 3l of aether with gt L of Laudanum was given. The abdomen was well rubbed with a liniment of Spt. of wine, camphor and laudanum. By this treatment the spasms gradually subsided; grx. of calomel were then given. From this time, till 5 o'clock in the morning he continued free from the spasms, and slept pretty well; when he rose to go to stool. He returned to his hammock, and had remained there about half an hour, when a person by accident discovered that he was dead. After death the gastrocnemii muscles were very much drawn upwards, and very rigid. From the suddenness of his death, it would appear, that the spasms had returned upon his going into his hammock, and seized on the muscles of respiration, or perhaps the heart itself; and produced instant death.

**CASE FOURTEENTH.**

In the first week of October, 1818, the Boatswain's mate of the Phoenix fell down on deck, while at work, with most complete and sudden prostration of strength and loss of speech, but with every agonized expression of great suffering, cold sweats, shrank features, and moaning; the contents of his stomach running from his mouth as if a sluice had been opened—Two pounds of blood were taken from him immediately; he was put into a warm bath, &c. had swallowed nearly 200 drops of laudanum before he began to revive. After which he fell into a profound sleep. This treatment was followed up by evacuating the bowels, and application of mustard poultices to the abdomen.—The man is now, 10th October, nearly well.

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**CASE FIFTEENTH.**

10th October: John Chapman, Seaman H. C. S. Warren Hastings, having gone on shore on the Island of Saugor for the purpose of interring the body of another Cholera patient, was left in charge of the boat, while the others proceeded to a proper place for depositing the corpse of their messmate.—Upon returning they found this man lying retching violently in the bottom of the boat; his extremities were cold, cramps had attacked his limbs; violent spasms had seized the muscles of the abdomen: he says he was suddenly attacked with a pain in his stomach, violent retching, vomiting, griping, and purging; quickly succeeded by cramps in his limbs. When he arrived on board he was in the lowest state of depression; the disease had only attacked him 3 hours before—He left the ship at 4 P. M. and arrived at 8 P. M.—R. T. Opii. gtt. c. in hot brandy and water; rejected.—The Laudanum

repeated to 120 drops in the same menstruum while he is in the bath. Habt. stat. calom. gr. xx. Retained H. 9 P. M. The symptoms seem rapidly to increase in violence. The depression seems to warn us that the scene is nearly finished—Capiat. Opii. gr. 11. Calomel gr. iii omni. semihor. Hot brandy and water ad libit. H. 10 P. M.—Extremities livid and insensible.—No pulsation returning to the extremities; heart palpitates and intermits in pulsation. 12th. Departed this life about 4 o'clock A. M.

#### CASE SIXTEENTH.

11th October----Edward Powers, Boatswain Warren Hastings, suddenly seized with depression, sickness and pain in his stomach; tenderness and griping of the abdomen; quickly followed by violent vomiting and purging of a clear watery fluid; stomach rejecting instantly what is taken in; great thirst, pulse 130; very small, and almost indistinct. T. opii gtt. 80 in hot brandy and water; rejected. Hab. opii. solid gr. v. Hab. calom. gr. xx. Rejected.—Repr. calomel gr. xv. Retained. H. 10 P. M. Griping and purging little abated; vomiting only occasionally of fluid taken into the stomach. Capt. Opii grss calomel. gr. iv. quart. q. q. hor. 12th. The more violent symptoms have in a great measure subsided; passes thin watery matter by stool, almost insensibly; much thirst; pulse 120; partial perspiration; starting in his sleep --Calom gr. iii quart q. h. H. 3 P. M. Complains of slight headach and vertigo; pain in his back and loins; thirst very great; tongue white; pulse 120; great heat of skin.--Omr. Bol e calom. Capt. Camphor gr. iii cal. gr. 11 quart. q. hor. Bib. decoct. herd. H. 10 P. M. Apparently composed, sleep quiet and uninterrupted; general and profuse perspiration; pulse 100, more full. 13th. Towards mor-

ning, skin became hot and dry; delirium ensued.—Tongue is now incrusted with a dark brown fur; thirst very great; pulse 120; very weak. Repr. pil.—H. 5 P. M. Delirium subsided; perspires freely; mouth begins to get sore. Habit. Decoc. Cinchon. lbj. vin. Rub. ʒij. Cap. ʒiv quater in die.—H. 10 P. M. Greater part of the medicine rejected. Purging continues; delirium recurs.—Applic. Emplast. Epispast. inter scapul.—14th. He is very low; delirium; low and muttering all night. Tongue very foul; thirst unabated; Pulse 130; very weak and tremulous—R. Sp. Æther. sulph. ʒiss Sp. Lavend. comp. gtt xl. Aq. Font ʒiv. aq. Cinnam ʒii cap. ʒi tert. q. hor. Vin Rubr. ad libit.—H. 5 P. M. Depression rapidly increases; pulse very quick; scarcely perceptible at the wrists or ankles; delirium has almost entirely gone; complains much of the soreness of his mouth.—Concr. medic. Appr. pedib. sinapsim. sinap.—15th. Hiccups have ensued; cold perspiration over his limbs; pulsation has forsaken the wrists and ankles; passes his urine and faeces involuntarily.—H. 3. P. M. Departed this life.

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## CASE SEVENTEENTH.

CAWNPORE; CASE OF LT. M.

APRIL 28TH, 1818.

Has been complaining 4 or 5 days of being sick at stomach; but did his duty, until 7 A. M. this morning on parade, suddenly obliged to quit from a watery purging.—At 10 A. M. informed me of the latter, and that he felt inclined to throw up. Sent him calomel g. xx. and desired him to wash it down with laudanum, 40 drops in 2 oz of peppermint water; staid down an hour; had some sleep, and awoke with cramps in the calves of his legs; he neglected to inform me, and that he had retching.—Thinks he threw up some of the calomel.

At 5 P. M. went over and found him walking about; retched before me; pulse small; at this time had no spasms; livid circle round the eyes; watery purging continues; gave immediately 2 oz. of castor oil, which staid down an hour, but on his drinking a mouthful of peppermint water, retching again came on; and a part of the oil was thrown up.—7 P. M. Was put into the warm bath; Spasms of his legs, thighs, hands and arms frequent.—8 P. M. Put a blister to the pit of the stomach. Ten minutes past 8 gave him 2 oz. of castor oil; staid down, and *evidently immediately* relieved the spasms, as he remained altogether quiet; and had been previously complaining and crying out much; watery purging at intervals.—½ past 8. Repeated the calomel; washed down as before; no vomiting now. ½ past 9. Spasms occasionally of the neck and lower jaw; much oppression and jactitation; blister rising; feet warm; hands rather cold; pulse very quick, small and feeble; 2 watery stools since the calomel.—Ten minutes to 10 P. M. Cramps of the legs. ½ past 10. Pulse more full; spasms transient; blister rising; less oppression.—½ past 11. Removed the blister; complaining much of it; oppression much less; pulse fuller, and hands warmer.—29th April, 1 A. M. Retched once, having taken a mouthful of warm brandy and water; brought nothing up.—5 minutes past 1. A watery stool; no oppression; hands warm; pulse much fuller; complains much of the blister, which had risen well.—½ past 1 A. M. Repeated the oil, but almost immediately rejected the greater part, with much watery fluid; then sunk down, and slept for half an hour.—At 2 A. M. some incoherency and subsultus tendinum; tongue white and loaded; but moist at the edges.—4. A. M. has been rather restless; but no complaint except from the blister; no vomiting or stool since.—5 minutes past 4. A. M. A watery stool.—½ past 4 A. M. Repeated the calomel g. xx; but without lau-

danium.—20 minutes past 4. A. M. Another watery stool.  
 $\frac{1}{2}$  past 5. A. M. Another.—6. A. M. Tongue cleaner; but dry.—7 A. M. Pulse not so good as at midnight; hands colder; feet natural; countenance anxious; eyes sunken with a livid circle round them; much annoyance from the blister.—8 A. M. A stool, watery, but with a very slight tinge of green (all former ones being colorless)— $\frac{1}{2}$  past 9 A. M. A stool; feculent matter about the size of pins heads' to be discerned; makes no complaint; says he is much better; no pain.—20 minutes past 10 A. M. Administered a glyster; dozes at intervals; hands and skin nearly of natural warmth; pulse fuller, but still very weak and quick; tongue more moist.  
 $\frac{1}{2}$  to 11 A. M. Passed the injection, slightly tinged with faeces of dark green colour.—Noon, a stool as at 9.— $\frac{1}{2}$  past noon gave him Pulv. Jalap. gr. xxx Super---Tart. Potass. gr. xl.—1 P. M. complains much of heat; skin rather warm and dry; hands warm; pulse quicker, but not weaker; countenance not so anxious; much flatulence; medicine stays down.—20 past 1 P. M. A stool somewhat better than the last; *passed urine for the first time since his attack.*— $\frac{1}{2}$  to 2 P. M. a stool, the same.—3 P. M. Threw up the Jalap mixture.—4 P. M. A stool, if any thing more consistent; passed some urine also.—10 minutes past 4 P. M. Another stool; evident green bile mixed.— $\frac{1}{2}$  past 5. Another; not so good—Sunset gave calomel. gr. xx.— $\frac{1}{2}$  to 8 P. M. Vomited a little phlegm and Conjee, but I do not think any calomel; sleeps at intervals, but is restless, and complains of heat.— $\frac{1}{2}$  past 8 P. M. Vomited again; inclined to sleep.—9 P. M. Retching much.—25 minutes past 9 P. M. A stool and passed urine.—Midnight. A stool more copious; has slept  $\frac{1}{2}$  of an hour, but is delirious; pulse small and weak; complains of difficulty of breathing;  $\frac{1}{2}$  of an hour after, another stool, much the same.—30th April, 4 A. M. Another stool, more brownish color.—6 A. M. Better; pulse and look improved.— $\frac{1}{2}$  past 6 A. M. Took

calomel gx.---8 A. M. A stool, dark green bile mixed.---11 A. M. Repeated calomel gr. x; sleeps quietly at intervals.--- $\frac{1}{2}$  past 2 P. M. A dark green coloured stool. 10 minutes to 4 P. M. Calomel repeated.---Sunset retched slightly; but did not bring any thing up.---9 P. M. Gave him a pill.---Extr: Coloc: C. et Gum Scammon.  $\alpha$  g. iij.  $\frac{1}{2}$  an hour after retched, but brought nothing up.---1st May, 3 A. M. A dark stool, more copious than any yesterday; not slept much.--- $\frac{1}{2}$  past 3 A. M. Another almost black, but more consistence.---6 A. M. A stool, dark green bilious matter.--- $\frac{1}{2}$  to 7 A. M. Another, more yellow mixed with the dark green.---8 A. M. Dark stool, small in quantity. 10 minutes A. M. Another, dark green, more consistency.---20 minutes past 10 A. M. Another, not so green.--- $\frac{1}{2}$  past 10 A. M. Took calomel gx.--- $\frac{1}{2}$  past 1 P. M. Repeated the calomel.---4 P. M. A stool, dark green, bilious consistency.---Sunset a slight one.---7 P. M. More copious dark green.---9 P. M. Repeated the pill of colocynth and scammony. 2d May, 6 A. M. Good night; 3 stools; did not see them; one copious.---8 A. M. A stool, better.--- $\frac{1}{2}$  past 9 A. M. Gave Jalap and Cream of Tartar as before, which staid down; his mouth slightly affected with mercury; his stools now being nearly of a natural color and consistency. From this time I considered him as convalescent.

### CASE EIGHTEENTH.

JOSEPH WIDOWS, PRIVATE 21ST DRAGOONS,  
AGED 39 YEARS.

April 28th, 9 P. M. Has had a looseness of his bowels for some time; was seized this afternoon with violent spasms of the abdomen, arms, and legs, with vomiting and purging, which still continue. Pulse small and frequent; tongue clean; thirst intense; skin cool.—R. Calomel. ppit. 21 statim. Empl. Lyttae, scrob. Cord. applicet;

and after the Calomel &c. Aq. Menthae 3iss Tinct. Opii. gtt. XL  $\text{\AA}$ ether Vitriol gt. xxx.—10 P. M. No vomiting, but frequent spasms and purging, &c. Magnes. Vitriol. 3s solve in Aqua menthae, cui adde  $\text{\AA}$ ether Vitriol. gtt. XL, to be taken during the night.—29th. Has had no vomiting during the night, but frequent spasms and several watery stools; countenance much dejected; eyes dim; clamminess of the skin; pulse small and frequent. Semicupium; to have brandy and water for common drink. Sago and Madeira.—R. Calomel. ppt. gr. V. Opii. gr. ss 3 tiis horis. Blisters to be applied to the calves of the legs.—7 A. M. Was faint after being a few minutes in the bath; appears greatly debilitated; eyes sunk; no vomiting or purging; & mist. Campt. 3ss  $\text{\AA}$ ether Vitriol. g. xxx Tinct. Opii. gt xxx. Has taken sago and a little brandy and water.—8 A. M. A copious watery stool. Rept. haust. dimid: quant: omni hora.—12 Hora. Has had some sleep, and feels better; has taken nourishment, and brandy and water; R. Calom: ppt. gr. v Opii. gr. ss 2 horis.— $\frac{1}{2}$  past 5. Has been dozing a great deal; no vomiting; one watery stool without any bilious appearance, which has always been the case; no pain or spasm; pulse better; skin of natural temperature. Cont. calom. & opium. Inungr. ungt. hydrag. 3i.— $\frac{1}{2}$  past 8 Contr. pil.—30th. Has passed a quiet night; slept tolerably well; no sickness: 2 stools; appears much dejected.—6 A. M. Pulse small and weak, with coldness of the skin; has taken his medicine and nourishment. R. Mist. camphor 3ij  $\text{\AA}$ ether Vitriol gt. xx Tinct. opii. gt. x 2 horis.—9 A. M. Has been sleeping; no vomiting or purging. Habit. ol. ricin. 3i aq. menthae 3i statim.—Vespere. No stool since the morning. R. calom. ppt. g. xv.—May 1st. Slept well, and feels better; had one motion this morning, Rept. calom. gr. x.—2d. Is much better. R. calom. ppt. gr. v opii. gt. ss ter in die.—3d. Appeared going on well an hour ago; but is now seized

with convulsions; pulse intermits; countenance and spirits dejected. Rx. Æther Vitriol gt. xxx Tinct. Opii gt. XL. The convulsions continued till the afternoon; and he died at  $\frac{1}{2}$  past 6 o'clock.

On opening the cavity of the abdomen, and examining the intestines, intro-susceptio of the Ileum to the extent of 12 inches was found to have taken place, where there was considerable inflammation, and thickening of the coat of the intestine. Inter-susceptio was also found in two other parts of the Ileum; but no alteration of structure could be discovered. The Colon was of its natural length, but contracted in various places; the stomach was greatly contracted; not larger in circumference than the colon, but shewed no appearance of inflammation; the liver gorged with blood; the gall bladder full of bile of a dark green color; the lacteals distended with chyle, and having a knotted appearance; the mesentery turgid.

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#### CASE NINETEENTH.

JOSEPH TINKER, PRIVATE 21ST DRAGOONS,  
AGED 24 YEARS.

1818. April 29th. Was seized to-day about 1 o'clock with headache and nausea; pulse full; skin hot. About 16 oz. of blood were subtracted; and ten grains of calomel given, which produced two or three bilious stools: shortly after he was attacked with spasms in different parts of his body, chiefly in his limbs; his extremities became cold, and a clammy sweat covered his face, neck, and breast. He immediately got some arrack, and his belly and stomach were also rubbed with it; his bowels had been costive previously, and it was ascertained, that he had been drinking rather freely yesterday.—5 P. M. He has been in the warm bath, and had a draught of æther and laudanum  $aa$  g. XL; pulse still very feeble, and ex-

tremities cold.—6 P. M. Emp. Lyttæ Epigastri. applicet.—Rept. Æther Vitriol gt. xx. Tinct. opii. gt. x omni hora.—½ past 8. Has had no return of sickness, but one watery stool; pulse small and weak; countenance sunk; clamminess of the skin; had once a return of spasms of the legs; thirst intense. Rx. calomel ʒij opii gr—m.—Expired at ¼ past 12 o'clock.

*Dissection.*—On opening the cavity of the abdomen, there appeared great vascularity of the omentum, stomach, and small intestines; the liver was perfectly sound, but of a light color; the gall bladder distended with bile of a dark green color; the stomach greatly distended; the small intestines in a state of incipient inflammation—and the colon contracted so much, as not to be of larger circumference, than a man's little finger, excepting a small portion, which was of the natural size.

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## CASE TWENTIETH:

THOMAS LOW, PRIVATE 21ST DRAGOONS,  
AGED 33 YEARS.

April 30, 1818. 6 A. M. Was seized last night at eleven o'clock, with violent cramps in the abdomen; followed by vomiting and purging, which have continued all night. He is now extremely debilitated; pulse not to be felt; coldness and clamminess of the skin; has cramps of the calves of his legs; and passes involuntary stools; countenance shrunk; eyes sunk; has taken a draught of 60 drops of Tinct. opii with 30 drops of Æther and afterwards ʒij.—of brandy.—Trismus came on; he was placed in a warm bath, but could not remain many minutes. He has taken since another draught of Æther; &c. as before; also some sago and madeira.—Habt. Calomel ʒi in Pulv. Frictions to the extremities. Rx—Emp: Lyttæ Epigastri.—9 A. M. No return of

vomiting or purging; skin cold; countenance almost black; eyes glassy and dim with turgescence of the vessels; pulse scarcely to be felt.—Habt. Ol. Ricini ʒi in aq. menthae ʒi—Expired at 10 o'clock.

*Dissection.* On opening the cavity of the abdomen, the omentum, stomach, and small intestines appeared in a state of incipient inflammation, and the colon considerably contracted. The liver was indurated; the gall bladder full of bile of a dark green colour.

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### CASE TWENTY-FIRST.

May 3d, 1818. *Francis Carpenter*, Private 21st Dragoons, a strong and muscular man, aged 25 years. Was relieved from guard yesterday evening, on account of a purging and inclination to vomit which came on in the afternoon. He had no spasms or cramp; was ordered a solution Antim: Tart. grj. in magnes: vitriol. ʒi which operated freely on his bowels; but he has had violent cramps in the arms, legs, thighs, and abdomen during the greater part of the night, with frequent vomiting and purging. Pulse small, weak and irregular; countenance shrunk; and coldness of the skin.—R Æther. Vitriol. gt. xxx Tinct. opii. gt. LX after which calomel ʒi with ʒi of brandy---Semicupium. In removing him from the bath a little brandy and water was given him, which produced sickness; he then took Tinct. Opii. gt. XL Æther Vitriol. gt. xxx Spt. Vin. Galliae ʒi. m. and afterwards Calomel ʒi cum. Opii. grj.; frictions to the skin, and a blister to the abdomen. A vein in the arm was opened, as his pulse appeared oppressed, and 6 oz. taken, when the pulse began to flutter, and the ligature was removed.—10 A. M.—No sickness; one watery stool; but the cramps unabated; pulse small and weak; tongue furred; Rx ol. ricini ʒi in aq. menthae

ʒi cum AEther Vitriol: gt. xxx. Blisters to be applied to the calves of the legs. Enem: Anodyn:—  
 1 P. M.—The injection retained about half an hour; no vomiting or purging; spasms still violent; pulse rather fallen. Habt. calomel: ppt. ʒi. in pulv.—6 P. M.—Seems rather better; no vomiting or purging; cramps somewhat diminished; had at 3 o'clock Ol. ricini ʒi in aq. menth. cum AEther Vitriol: gt. xxx.; Pulse rather stronger; tongue foul.—R—Calomel. ppt. gr. x opii. gij. statim.—Vespere—R ol. ricini. ʒj. ut antea. Enema Purgans.—Hora 9. P. M.—R Calomel ppt. gt. x; et g. v. 4 horis.—5 A. M. 4th—Has passed a tolerable night; 2 stools; no vomiting, but frequent retching; spasms still troublesome; pulse small, and irregular; tongue furred, and dry; complains of intense thirst. Has taken 5 gr. of calomel since 10 o'clock.—Habt. Pil. opii gi.—Brandy largely diluted for common drink.—7 A. M. Semicupium—R ol: Ricini ʒi aq. menth. ʒi AEther gt. xxx.—Bore the bath well, continued in 2.5 minutes—R calomel. gr. v et opii gi 4 horis.—6 P. M. Has thrown up the castor oil, and vomited frequently.—Dysuria; several watery stools; pulse small and weak—surface cold. Habt. Calomel ʒi ol. Ricini ʒi aq. menth: ʒi—9 P. M. The castor oil retained, but the surface more cold; pulse not to be felt. Habt. calomel g x.—May 5th. Died at 3 o'clock A. M.

*Dissection.* On opening the thorax, the lungs appeared collapsed. On opening the cavity of the abdomen, the stomach was found to be greatly contracted, not larger than the colon, and its inner coat singularly corrugated or drawn up into folds, particularly near the cardia, but no appearance of inflammation.—The colon of its usual size.—Intus-susceptio of a few inches of the Ileum without any change of structure.—The vessels of the liver turgid with blood; the gall bladder

distended with bile of a dark green colour; the other viscera natural.

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### CASE TWENTY-SECOND

The following is a minute dissection of a Native dying under the usual symptoms of exhaustion.

#### MEERUT.

The person being a stranger, and not claimed after death, I easily succeeded in examining the body on the following morning, which when brought to me exhibited far greater tension and rigidity of the muscles of the neck and upper extremities, than is usually the sequel of death in ordinary cases; but, externally, there was no other particular appearance. On opening the thorax, the heart, externally, and in all its cavities, was perfectly natural; the lungs, however, were peculiarly flaccid and collapsed, and of a singularly bluish colour; this being the only exception to a natural state of the thoracic viscera. On dividing the parietes of the abdomen, and exposing its contents to view, my attention was first directed to the appearance of the stomach; which was unusually distended, and contained a portion of fluid, but by no means proportioned in quantity to the great distention of the organ.—Its external surface, that of the mesentery, and the whole of the intestinal tube, exhibited considerable marks of inflammation; which on further examination, was found to have affected all the peritoneal coverings throughout the abdomen; including the surfaces of the whole intestinal canal, from the duodenum to the rectum.—The external appearance of the liver was also natural; save that of its colour, which, like unto the lungs, was singularly and unusually purple.—On examining its inner surface, the peritoneal covering and cardiac margin of the left lobe were inflamed considerably; as was also the gall bladder, which contained 2oz.

of bile, of a thick consistence, of a deep black colour.—Great turgidity of blood was evinced, on cutting the parenchymatous substance with the scalpel.—The pancreas, spleen, and kidneys appeared natural; and had no marks of inflammation.—A double ligature was now passed on the extremities of the stomach, each including an inch of the oesophagus and duodenum; when the organ was removed from the body for closer examination.—On dividing its parietes from the cardiac to the pyloric extremity, a pinkish white coloured fluid, in quantity 24 oz. escaped (into a glass vessel placed to receive it), closely resembling barley water, or thin *congee*.—This fluid quickly deposited a sediment of a light brown colour, more like to the deposition from fresh made barley water, than to any other substance.—The *ductus communis* was pervious to a probe, and of natural appearance.—There was no bile in the stomach, such as that contained in the gall bladder; nor any other substance, save the fluid already noticed.—The inner surface of the stomach was generally inflamed, and in small patches, but chiefly about the cardia and pylorus.—The external view of the inflammation of this organ, was that of thick spiral lines.—Similar also to that of the intestines.—The rugae of the stomach were so diminished in size, as to be only traced with difficulty. The duodenum, next in order, and the whole intestinal canal, were now carefully examined, but exhibited no marks of bile, inflammation, or faeces in their upper surface; tho' a portion of fluid, not unlike unhealthy pus, was more or less diffused throughout the canal. The unusual distention of the stomach was common to the whole intestines; the bladder was found empty, and of natural appearance; but the peritoneal coverings of the pelvis, like those in the abdomen, had suffered from inflammation.

The appearances thus described, not seeming to me sufficient of themselves to account for death, I next

examined the contents of the cranium. The skullcap, on being removed, exhibited a very considerable degree of inflammation on the external surface of the dura mater; and an apparent circumscribed effusion on the cerebral surface pointed out a rupture of the longitudinal sinus in its occipital portion. The dura mater, on being carefully detached from before backwards, displayed a rupture of the sinus, and extravasation to the size of a crown piece at the junction of two veins, formed by the superficial cerebral plexus, inosculating with the sinus itself. More minute dissection of the falk demonstrated this rupture; also a high degree of inflammation on the upper surface of the brain and pia mater; also evident venous congestion, and, in some parts of this membrane, a thickened, serous effusion. On examining the lateral cavities, about 2 ozs. of fluid escaped from the left ventricle; more however was found in the remaining three. The cerebellum was of a natural appearance, and free from any marks of vascular action; but the membranes lining the case of the skull were considerably affected.

### CASE TWENTY-THIRD.

DELHI.

Pahar Sing, Sepoy Light Company 1st Battalion 5th Regiment Native Infantry, a stout young man; admitted July 23d, 6 P. M.—While on duty, was seized with purging; he vomited 3 times in the course of 2 hours, without violent retching; he took some sherbet to allay the sickness, and a burning sensation in his stomach.—Upon being brought into the Hospital he vomited once; extremities cold; countenance sunk; and pulse scarcely perceptible.—A scruple of calomel and 100 drops of laudanum were administered.—Did not vomit after the calomel.—The cold in the extremities increased, notwithstanding the use of frictions with warm cloths, &c. and in less than an hour, at 7 P. M. he died.

### CASE TWENTY-FOURTH.

Khemma, Ordnance driver, died in a Dooly on the way to the Hospital. He had had considerable purging, with slight vomiting for 5 or 6 hours.---Had drank a considerable quantity of cooling and diluent liquors.---This case is mentioned on account of the dissection, as the disease followed its natural course without any medicine having been administered.---Upon opening the abdomen the stomach was completely distended with a fluid resembling congee water.---The vessels of the stomach and bowels turgid with blood; and one spot on the inner coat of the former, about the size of the palm of the hand, highly inflamed; a general inflammation over the bowels: the other viscera more turgid with blood than natural, but not otherwise affected.---Not the slightest appearance of bile in the gall bladder, ducts, stomach or intestines. Head not inspected.

### CASE TWENTY-FIFTH.

Omnee Opudeah, Sepoy Light Company 1st Batt. 5th N. I. Admitted 91st July, 7 A. M. Complains of slight purging, without pain or griping; skin and pulse nearly natural; tongue foul; purging came on about 2 A. M.---Habt calomel gr. viij. rhei. gr. xxv. At 11 A. M. hands and arms getting cold: pulse scarcely perceptible; countenance sunk as in Cholera.---No burning heat in the stomach.---Upon the most particular enquiry it is found that he has not vomited once; and the calomel and rhubarb remained on his stomach.---Had 6 watery stools.---Habt Calomel 31 et Tinct. opii 3i in aq menth. Pip 3i---2 P. M. Continued frictions with the hands and warm cloths were used without any effect.---Also blistered over the Epigastric region with Tinct. Cantharid. At 2 P. M. he died.

He vomited one mouthful of watery fluid while in articulo mortis; there was no vomiting during the whole of the disease except this.

### CASE TWENTY-SIXTH.

Doorbiju Sing Sepoy, 5th Company 1st Battalion 5th Native Infantry. Admitted 30th July at 10 A. M. A few minutes before 10 A. M. had been seized with rather severe vomiting and purging. Was previously in perfect health. Extremities cold and clammy; pulse just perceptible at the wrist; tongue foul; burning sensation at the stomach; great anxiety and restlessness.---V. S. statim ad  $\frac{3}{4}$  xxiv. Habit calomel et Tinct opii gtt. 100---11 A. M. heat of stomach lessened; but the vomiting continues. Repr. calomel et Tinct opii.---2 P. M. vomiting has ceased; uneasiness and anxiety gone; pulse perceptible; extremities still cold; skin blistered by the Tincture of Cantharides.---5 P. M. Habit. Infus. Sennae  $\frac{3}{4}$  iv.---31st, 6. A. M. A restless night; has been purged by the senna freely.---No bile in his stools; no vomiting; very weak.---Habit. ind. Spt. Vini  $\frac{3}{4}$  i. Habit. Sulph. Magnes.  $\frac{1}{2}$  1 6 P. M. freely purged by the salts; mouth sore; tongue still foul; no appearance of bile in his stools. August 1st, no complaint but weakness and sore mouth; tongue cleaner; some mixture of bile in his stools. Habit. Tinct. Sennae  $\frac{3}{4}$  i---August 2d. Convalescent---Cont. Tinct. sennae.---5th. Convalescent.---7th. Discharged.

### CASE TWENTY-SEVENTH.

NAGPORE.

Sewbuccus Havildar; probable age 38 years; admitted evening 30th May. Symptoms: excessive vomiting;

frequent watery stools; with griping pain in the bowels; pulse small and irregular; skin cold; spasms of the extremities. Rx Tinct. opii gtt. 80 ol. menth. pip. gtt. xx aq. purae 3ss ft. haustus; to be given every half hour. 9 o'clock P. M. has had the above given twice; symptoms not relieved; complains of violent pain at the navel; let a Blister be applied to the part. Rx Tinct. opii gt. 60, ol. menth. pip. gtt. xx aq. pyrae 3ss ft. haustus; to be given every half hour with 10 grains of calomel.—31st. May. Excessive retchings; frequently going to stool, but passes nothing but water; pain in the bowels increased; pulse small; skin cold, and clammy; spasms of the extremities; great prostration of strength.—The Blister has risen well, but no relief produced by it.—At the above draught has been constantly thrown up, omit it; and let warm brandy and water be given, every half hour, with five grains of calomel.—12. o'clock P. M. Symptoms not relieved; prostration of strength increased; no stool produced by the calomel. Rx Brandy 3ss Laudan. gtt. 60 aq. bullient. 3ss ft. haustus; to be given every hour with ten grains of calomel; and let the feet be bathed in warm water every hour.—6 o'clock P. M. No stool as yet produced by the medicine; symptoms: excessive retchings; general coldness of the body; pulse scarcely perceptible; spasms of the extremities more frequent; constantly going to stool, but passes nothing but water; griping pain in the bowels; general prostration of strength. Rx Brandy 3ss Tinct. opii gtt. 100 ol. menth. pip. gtt. xx aq. purae 3ss ft. H. to be given every half hour with ten grains of calomel. This medicine was given until 9 o'clock regularly; after which he was incapable of swallowing, and remained sinking in this wretched way, until half past three o'clock, A. M. of the 1st of June; when he expired. . . .

### CASE TWENTY-EIGHTH.

Sewuk Misser Havildar, aged 43 years; admitted ½ past 1<sup>st</sup> A. M. 31st May. Symptoms: vomiting; burning heat of the body; total insensibility; pulse quick and irregular; stertorous breathing; tongue dry. Rx calomel 31j to be put on the tongue, and washed down with two ounces of peppermint water; apply a blister to the nape of the neck.—3 o'clock P. M. Has vomited twice since twelve o'clock; heat of the body increased; insensibility; convulsions of the lower extremities; pulse irregular; breathing difficult. Rx calomel. 31 Pulv. Jalapi 31; to be put on the tongue and washed down with peppermint water. The blister has not risen. May 31st, 6 o'clock A. M. Burning heat of the body; total insensibility; Pulse quick and intermitting; difficulty of breathing; convulsions of the whole body; great prostration of strength; involuntary discharges of faeces and urine. The Blister has not risen; let one be applied to each temple. Rx Tinct. opii gtt. xxx ol. menthl. pip. gtt. x Æther Nitr. gtt. xxx aq. purae 3i, to be given immediately.—9 o'clock P. M. burning heat of the body; total insensibility; pulse irregular; general convulsions of the body; involuntary discharges of faeces and urine; incapability of swallowing; difficulty of breathing increased. Let an Enema of Congie and Laudanum be thrown up frequently.—He continued sinking through the night, and died at 2 o'clock A. M. on the 1st of June.

### CASE TWENTY-NINTH.

Bowany Deen Dooby, Golundauze. 31st May, 1 o'clock P. M. complains of burning heat and acute pain at the scrobiculus cordis, with a watery vomiting and purging.—Let him have 20 grains of calomel, 60 drops of laudanum; and an ounce and a half of brandy, with the same quantity of water.—3 P. M. Vomiting and purg-

ing incessant; pulse very quick and feeble; extremities cold; and his body wet with cold clammy sweats;—Repeat the calomel, laudanum and brandy.—5 P. M. Is lying in a state of perfect listlessness; countenance collapsed; pulse scarcely to be felt at the wrist; eyes fixed in their sockets, and of a glassy appearance.—Let him have two ounces of brandy in the same proportion of water.—Died at 8 o'clock P. M. On dissection found the following morbid appearances.—The intestines and stomach highly inflamed; the former clogged up by a yellow fluid, something resembling the matter of an abscess; and the latter filled with muddy water. The liver was natural; but little or no bile in the gall bladder and ducts; and that little, vitiated and fetid, of a dark green color, almost approaching to black.

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### CASE THIRTIETH:

#### MALWAH.

Purum Sook Dooby, Sepoy, admitted 24th April 1819; aged, 24.—Symptoms—he was admitted this morning at 4 o'clock; about fifteen minutes before he was brought into Hospital, he was suddenly seized with vomiting and purging of a discoloured watery fluid in small quantity. When I was called to visit him, I found him in the following condition: he complained of great thirst; his extremities were violently convulsed, as were the muscles of the face; the mouth was much contorted; his eyes were sunk; his extremities became cold; the pulses were imperceptible; he did not complain of pain in the abdomen, which he allowed to be pressed without shrinking.—He took a scruple of calomel, and eighty drops of laudanum on admission.—Bibat. aq: ammon: spt. 3ij ex pocul aq: hord. dimit. quaque hora; frictions with flannel moistened in brandy were assiduously applied to the abdomen, and extremities.—He continued much in the same state till about six o'clock, A. M. when the

pulse became perceptible ; after this period he took only one dose of the stimulating draught ; his thirst was much abated ; his heat began to return : he had a pleasurable sensation of warmth at stomach.—The convulsions ceased after he had taken the calomel with laudanum, and two of the draughts : his pulse increased in strength, and about nine o'clock A. M. perspiration was apparent on his forehead ; which soon became general ; and at ten o'clock A. M. he declared that, with the exception of debility, he had no other complaint, when I reported him out of danger to the Commanding Officer.—25th. He slept soundly during the night, and had a natural motion this morning ; he has no complaint, but that of weakness ; he says he is very hungry.—26th. No complaint.

### CASE THIRTY-FIRST.

NAGPORE.

Hindoo Sing Sepoy, admitted into Hospital on the morning of the 30th May 1818 ; probable age 32 years. Symptoms : excessive retchings ; great thirst ; pulse small and scarcely perceptible ; skin cold, and clammy ; spasmodic affection of the limbs and muscles of the abdomen ; constantly going to stool, but passes nothing but water ; griping pain in the bowels. Rx. Tinct. opii gtt. 60. ol. menth pip. gtt. xx aquae purae ʒij st. haustus ; to be given with twenty grains of calomel every half hour.—10 o'clock A. M. has had the above given three times symptoms greatly aggravated ; coldness of the body, and spasms increased ; complains of violent pain about the navel.—Let a blister be applied to the part ; and repeat the medicines as above directed.—He continued sinking in this deplorable state until 12 o'clock, when he expired ; being two hours and a quarter from his admission.—The medicines had not the least effect to overcome the disease.

## SUPPLEMENT.

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THE body of the foregoing Report was completed towards the end of June, from documents coming down to the commencement of that month.—From the general tenor of those documents, there seemed some grounds for hoping, that the dreadful mortality, to which they related, was on the decrease; and that we should soon be wholly released from a pestilence, which had ravaged India during a period of more than two years, and spread dismay and destruction into every portion of its provinces.

The six months, which have since elapsed, have, unhappily, disappointed these expectations. During no part of this time, can the country be said, to have been wholly free from the disorder; and at several distinct periods, and in distant quarters, it has again shewn itself in such an appalling, and widely Epidemick form, as to leave no doubt, that the distemperature of the air, in which it originated; yet subsists, and is ever ready to be brought into action, by those external agents, which have been enumerated above, under the head of Predisposing and Exciting Causes.

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Awfully violent as some of its recent attacks have been, it cannot be said, that during their prevalence, the disease has developed any new laws; or displayed itself under any new form, different from that in which it first came amongst us. Much cannot, therefore, be learnt from a narrative of its latter progress. But, as the appearances of those attacks generally, have tended materially to confirm some, and to overthrow others, of the inferences respecting the peculiar habits of the disorder, which we ventured to draw on the strength of former experience; and further to establish the efficacy of particular modes of treatment; it will be necessary that, at the risk of tediousness, and of further prolonging a work already too diffuse, we should give some account of them. In doing so, however, it shall be our endeavour, to avoid the introduction of all unnecessary matter; and to comprise what we have to say, in as short a space as possible.

It will be in the reader's recollection, that in the spring of the present year, the Epidemick raged extensively in Nagpore and Malwah; and largely affected the Nerbudda Field Force, and the several Detachments serving under Colonel Ludlow, in the vicinity of Neemuch, in April and May. On the 8th of the latter month, it reached the Saugor Division of the Army; became

violent on the 18th ; declined towards the end of the month ; and finally ceased on the 4th of June. The Natives alone were affected. Sixty-four persons were admitted ; of whom 19 died. The 1st Battalion 26th Native Infantry, the men of which had previously suffered much from fever and dysentery, and had impaired their constitutions by remaining long in the hospital, were chiefly affected. It had 54 admissions, and 18 deaths, from a strength of 868. On the 21st it buried six men. This corps was with the Left Division on its being attacked during April of the preceding year ; and had then 8 seizures, and 2 deaths ; but the 2nd Battalion 28th Regiment, which on that occasion had 56 seizures and 29 deaths, now wholly escaped. So, the 2nd Rohilla Cavalry, which had likewise been stationed, when with the Rajpootana Force in September, did not lose a man, from a strength of 1125 : although encamped closely to the 26th Regiment. Calomel, opium, and other usual remedies, here seemed of no avail; tho' the former was often pushed in doses of 60 grains. The lancet could alone be depended on ; and when used early, and to the extent of from 20 to 40 ounces, often saved the patient,

The disease next reappeared in the Rajpootana Force. It first shewed itself mildly on the 8th of June in the Rampoora Local Battalion;

But did not affect any other corps till the 20th, when it became general. The attack was upon the whole a mild one. Excepting one officer, who unfortunately sunk from debility and relapse in a late stage of the disorder, the Europeans remained wholly exempt; and from a Native force of 9738 men there were during the month only 106 admissions, and 25 deaths. The mortality fell chiefly upon the 2nd Battalion 7th Native Infantry, then affected for the first time; and on a detachment of 340 recruits: the former having 18 admissions, and 6 deaths; and the latter 57 admissions, and 8 deaths. The remaining casualties were shared by the other corps: But the 1st Battalion 28th Native Infantry, and 5 companies of the 1st Battalion 27th Native Infantry, both of which had suffered severely in the previous September, now wholly escaped; and only a few cases, all terminating favorably, occurred in the 2nd Battalion 19th Native Infantry, which lost many men at Mundessore in August. In one division of the 27th Native Infantry, there were 7 admissions and 5 deaths; but all these took place in persons who had been absent from the corps during the sickly period of September. Some cases appeared in a detachment of the 2nd Battalion 7th Native Infantry on duty in the garrison of Jaragurh, a thousand feet above the plain; while the inhabitants of the town of

Ajneer, on the declivity and at the base of the hill, escaped. The disease still continued to prevail in the Division, though with gradually declining violence, during the beginning and middle of July; but entirely ceased on the 20th of that month. The number of admissions during the month was 70; and of deaths, 20. The 2nd Battalion, 7th and 1st Battalion 19th, each lost 7 men. Several Europeans were likewise affected, and 2 Officers, 3 Privates, and 1 woman cut off. The disorder appeared to abate after a long and heavy fall of rain. The weather previously to the reappearance of the disease in this quarter had been cloudy and sultry, with frequent thunder storms and showers, variable winds, and but little fluctuation of the thermometer; which usually stood at 81 at sun-rise, and 97 at noon. In the early stages, the treatment was nearly as during the former year. The secondary symptoms were uncommonly severe; and to counteract them, mercury was largely employed.

At this time, the virus did not in this quarter appear to spread in any particular direction; the body of the air seeming to be generally corrupt, and indiscriminately to exert its malignant qualities, wherever they happened to be called into action by great and sudden vicissitudes of the weather. Thus the disease left Neemuch in the end of May, and appeared in

Nussurabad, nearly eighty miles further North, on the 12th June; but it was not till the 18th, of the latter month, that it reached a Detachment posted half way between these two stations, just after its being exposed to remarkably inclement weather.—In July, some Corps of the Nerbudda Force suffered considerably. Thus the 1st Battalion 8th Native Infantry had 40 cases and 9 deaths; and the 1st Battalion 15th Native Infantry, 13 cases and 5 deaths. Both of these Corps had been previously exposed; but we have no particulars regarding the descriptions of men now affected. From this month downwards, the disease ceased to be epidemick equally in the Nerbudda, Saugor, and Rajpootana Divisions; and gradually gave place to fevers, and other complaints common to the climate and season.

We must now turn our attention to the Central and Upper Provinces. The state of the atmosphere in the whole of these tracts was at this time remarkably favorable to the existence of the Epidemick. The Rains did not regularly set in for many weeks after their customary time; and as the Hot Winds continued to blow without interruption during June, July, and part of August, the heat had latterly become almost intolerable, and the whole face of the country entirely parched up.—Nevertheless, the epidemical dis-

position of the air had certainly abated; since from Cawnpore downwards, the disorder can scarcely be affirmed to have prevailed generally, subsequently to the conclusion of the period included in the Report.—For, although a few cases now and then appeared at Dinapore, Mulhye, Chunar, and places in their vicinity, in May, June, and July, the aggregate amount of those was very inconsiderable; and only went to shew, how greatly the sickness was on the decrease.—In Cawnpore too, it soon gave way to violent remittent fever; which proved exceedingly severe and fatal, especially amongst the European Troops: sometimes cutting off the patient almost instantaneously, with every symptom of apoplexy.

The Epidemick made its second appearance at Agrah\* on the 27th of May; was very destructive during the first week of June; abated about the 10th of that month, and wholly withdrew on the 15th, after several rainy days. Contrary to what had been observed in the preceding

\* We are indebted for the account of the progress of the disease in this quarter, almost wholly to the valuable communications of Mr. Gibb, Superintending Surgeon of the Division, and of Mr. Surgeon Jackson, H. M. 14th Regiment. Mr. Gibb's views, indeed, of the true nature and treatment of the malady, appeared to the Medical Board so just and luminous, that nothing but the lateness of their arrival, and the previous great length of this Report, prevented their being published in full.

year, it raged with great violence and mortality in the city.—Its range in Cantonments was comparatively limited, and chiefly confined to the 1st Battalion 7th Native Infantry, which had 36 cases and 15 deaths. The total number affected was 3 Europeans and 39 Natives: of whom 17 died. There were likewise four deaths in the Jail.—Following the course of the Jumna, the disease reached Muttra in the end of June; and there exerted its influence in a slight degree throughout the whole of the succeeding month. It could scarcely, however, be said to be Epidemick; as only 29 cases and 7 deaths occurred in the Infantry Lines; and not one in the Cavalry Corps, or in the town. Thus Agra, which in the former year had nearly escaped, was now severely visited; whilst Muttra, then dreadfully scourged, now remained wholly unaffected. During this period Mynpooree and Futtigur were quite healthy; and at Coel the disease scarcely appeared. Not a single case offered in the town, or jails; and although no less than fourteen Sepoys labouring under the disorder were received into the Battalion Hospital from a party which had returned from Agra, two cases only occurred in Cantonments, and both of these nearly a month subsequently to the arrival of the infected party.

Sporadic cases had been very frequent among the Europeans—especially the drunkards—at Meerut, for several months; but it was not until August, that the disease recurred in an epidemical shape. On the 9th of that month, it appeared in the Bazar of His Majesty's 14th Regiment of Foot, and ceased there after carrying off 40 out of 50 attacked.\* Mussulmudans and Hindoos suffered equally; and among the latter, three persons who were understood to have had the disease in August of the former year. This bazar is a remarkably confined and noisome place in the centre of the Cantonment. On the 12th, the pestilence reached the town, in which, between the time of its first approach and the end of the month when it wholly disappeared, it, according to the Police reports, killed 70 out of an unknown number attacked. On the 28th, it entered the bazar of His Majesty's 8th Dragoons; and, after destroying 14 persons (10 Mussulmen and 4 Hindoos), withdrew on the 17th September. Many cases, but of a milder type, at the same time occurred in the bazar of the Native Battalion; and some of these secondary to attacks in the preceding season. In the Sudder Bazar, which during the first visitation had suffered more severely than any other spot, a few cases only occurred now, and those .

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\* The numbers attacked were probably underrated.

few generally mild, although through neglect more than one half proved fatal.

We next come to its effects upon the troops; and as there was here something very remarkable in the great fatality, and partial distribution of its attacks, it will be necessary to enter somewhat more largely into particulars, than the concise nature of these remarks may perhaps well admit. The total strength of the Force in Cantonments, was 2364 Europeans, and 1342 Natives. It was composed of His Majesty's 8th Light Dragoons, His Majesty's 14th Regiment, the Horse Brigade, the 1st Battalion 25th Regiment Native Infantry, a Detachment of the Provincial Battalion, and the Gun Lascars of the Horse Brigade. Part of the Horse Brigade had suffered severely with the Centre Division in 1817: and slightly in 1818. Of the other Corps, His Majesty's 8th Dragoons had had 7 seizures and 2 deaths at Meerut in August 1818; His Majesty's 14th Regiment 3 seizures and 1 death; and the Provincial Battalion had remained free. On the present occasion, the 8th Dragoons had only eleven cases and two deaths; whilst the Horse Brigade, the 25th Native Infantry, the Provincial Battalion, the Gun Lascars of the Horse Brigade, and all the Officers, entirely escaped; so that nearly the whole force of the dis-

case was directed against the unfortunate 14th Regiment.

During all July and the early part of August, the weather had been very sultry and close; with little heavy rain, frequent drizzling showers, low clouds, and hazy atmosphere;—the heat being almost insupportable at night, and at all times much higher to the feelings than it appeared by the Thermometer, which usually ranged between 83 and 90 at 2 P. M., with a fluctuation of only a few degrees between morning and evening. The wind was throughout Easterly.—The prevailing diseases had been fever, hepatitis, gastritis, and enteritis.

On the 8th of August, the first case of Cholera appeared in the 14th Regiment, which, including invalids and convalescents, had then 200 sick in Hospital from other complaints. On the 12th two cases occurred; on the 13th and 14th about 10 were brought in. On the 15th the morning was more sultry than any in the month. Eight hundred men of the Regiment went to Church in the Dragoon Lines. Some were attacked in Church; some on the march back; and some in the barracks after breakfasting heartily. Several were dead before night. Heavy rain fell in the afternoon, and cooled the atmosphere; no fresh cases occurred, and the symptoms of such of

those already affected as were not too far gone, became less severe. On the 16th, there was drizzling rain; and fresh cases offered, but of a milder sort. On the 17th and 18th, the men came in so fast that the Hospital got exceedingly crowded; and it became necessary to accommodate the fresh cases in the school room, and the convalescents in an empty Barrack in the Dragoon Lines. It rained heavily in the day of the 19th, and there were few fresh admissions; but in the night, which was sultry, they were more numerous than ever.—The pestilence was at its height on the 20th; the day was hazy, damp, and oppressive; and many men were brought in, past hope of recovery: all vital energy being from the commencement nearly extinguished. Many invalids in hospital, were now seized, and, being much debilitated by previous disease, sunk almost without an effort. On the morning of the 21st, a steady breeze sprung up from the East, and brought with it clear weather; and happily from this time the disorder declined quickly, and soon after entirely disappeared. Two slight cases occurred in the succeeding night, and one or two next day. On the 23d, the Regiment moved out of barracks, and encamped on the race ground, where it remained till the 29th: the barracks, privies, &c., being in the mean time thoroughly cleansed and white washed. Three or four cases appeared in camp; but the weather being wet,

the grass long, and the ground, tho' high, soaked with rain, dysentery soon got the ascendancy, and proved remarkably severe.

During the whole period of its present visit, the Cholera in this Regiment attacked 221, and cut off 41 persons, from a body of 1,200 rank and file : the seizures being as one in five and a half of the whole Corps ; and the deaths nearly in like proportion to the seized. Some relapses occurred and terminated fatally. The disease commenced, in the Eastern wing of the barracks, and proceeded in a westerly direction ; but suddenly stopped at the 9th Company : the Light Infantry escaping with one or two slight cases only. The 8th Dragoons were situated to the left or west ; and the Horse Brigade to the right of the 14th.

The symptoms in some respects differed from those usually presented by the disease in other quarters. Bilious vomiting was very common in every stage ; and probably one third of those attacked had greenish discharges in the first instance, and many for several hours, or even days. In such cases the tongue was covered with a yellowish, or dark brown fur ; whereas in those with watery evacuations, it was whitish, and clammy, or but little changed from its natural state. The stools were generally bilious, and watery. Sometimes, there was no vomiting ; sometimes no spasms ; .

and sometimes the intestines were torpid. In the first few days, all the deadly symptoms of cold and collapse were invariably present; but towards the 18th the disease was sometimes accompanied with ardent fever: quick, hard, small pulse; burning skin; flushed face; inflamed eyes; and excessively foul and loaded tongue. These cases were marked rather by a tingling and numbness of the limbs, than by violent spasm; and were less destructive, than those coming under the usual form of the disease. The attack was in general sudden, and where fatal, cut off the sufferer in a period ranging between nine and forty-eight hours. Want of appetite, however, usually preceded; and in many instances slight looseness. It seized the sober and drunken equally; but the latter sooner fell victims to it. Two puerperal women were attacked, and both died. The dissections shewed nothing particular. Traces of visceral inflammation were commonly found. The stomach was filled with greenish, muddy fluid. The urinary bladder was always empty. In all other points, the appearances corresponded with those described in the body of the work.

Large and repeated bleedings proved the only efficacious means of opposing the disorder. During the first few days bleeding was not always practicable; and then the cure was attempted by large doses of calomel, with lau-

danum and stimulants. But this plan wholly failed ; and there seemed reason to doubt, whether calomel was not always either useless, or hurtful. The lancet was then universally resorted to, and with great success. It would be mere repetition to go on enumerating the variety of means used in aid of this chief remedy. They were such as have been found generally efficacious in other quarters. Opium and laudanum were advantageously given in very large quantities. In many cases laxatives were throughout safely dispensed with ; and when required, the mildest proved the best. The most approved means often failed, from the unparalleled violence and rapidity of the attack.\*

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\* Trismus occurred in one or two cases. The inflammation in the internal coats of the stomach had sometimes gone on nearly to sphacelus. Sometimes it was so slight, as to be nothing more than venous congestion. Sometimes it was wholly absent ; and at Kurnaul not a trace was found in five bodies, tho' several had been long ill, and had used every kind of stimulant. Some were taken ill whilst under the influence of mercury for other complaints ; in others a salivation supervening upon the primary attack was followed by relapse and death. Calomel sometimes seemed to re-excite the allayed irritability of the stomach. In one division of H. M. 8th Dragoons it was not at all employed ; yet all the patients, European and Native, recovered under the lancet, and large doses of opium. Laudanum was usually given in doses of 100, or even 200 drops, or two drachma, at a time. A sickly Native took 600 drops in one night and recovered ; and a gentleman at a distance from Meerut,

We shall, upon enquiry, find that there existed some reasons why the cantonment of Meerut should at this time have again fallen under the disease; and why His Majesty's 14th Regiment should have been so peculiarly singled out, and so cruelly affected. The cantonment bazars were in a very filthy state; the roads in a broken, bad condition; and the drains a mere succession of stinking pools. No filth carts were allowed; and the cleaning of the streets and dunghills was left to the beasts and birds of prey. This was the general state of the Cantonment at large; and it is natural to suppose, that the immense load of foul, and corrupt matter, thus constantly generated, must, especially when aided by the great heats of June and July, and the moist weather of July and August, have presented to

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was saved from impending death by swallowing 400 drops in two or three hours. It never in the largest quantities induced affection of the head. Fatal relapse was not very uncommon where bleeding was largely, and even repeatedly employed in the commencement. The warm bath was decidedly useful. Among the juvantia, dilute sulphuric acid seemed to be serviceable. Iced water was successfully employed in one case, in which there was incessant vomiting, and unquenchable thirst. In the severer cases, every thing taken into the stomach was rejected instantly, and generally with great force.—It may be here mentioned, that the Actual cautery, by burning with a hot iron in the Epigastric region, has been recently found effectual in allaying the irritability of stomach and abdominal spasm, in another part of the country.

any epidemical disorder, a field peculiarly favourable for its malignant operations. The state of that portion of the cantonment which was set apart for the accommodation of His Majesty's 14th Regiment was yet more inviting. The barracks, although clean and well ventilated, were originally too confined; and from the married and unmarried men being thrown together, were still more contracted and shut up by the latticed partitions, and large curtained cots set up by the former for the purposes of separation and comfort.\* The privies were too few in number; and could hardly be kept clean or wholesome. The effluvia proceeding from them was at times exceedingly offensive, even to a great distance; and many of the worst cases were those of men seized in them with violent spasms and vomiting. The bazar, too, of the Regiment, in which the disease first broke out, was an abominably filthy, confined hole. It moreover appears, that the men of the 14th were in the habits of sleeping in the open air; and of going into the sun, and constantly resorting to the Sudder Bazar: "the most noisome of all filthy and suffocating places."

These perhaps, were sufficient causes for this Regiment suffering more than the others. But they leave us unsatisfied on many material points.

\* There were about 170 women, with their children in the Barracks.

They do not tell us, why, when the Epidemick was present in the former year, this same Regiment should have nearly escaped ; nor why in the present instance, the disease, when once amidst it, should have stopt short at the 9th Company ; and after a few days, of tremendous destruction have suddenly disappeared, without apparent adequate cause. They do not explain, why the Horse Brigade on the right, and the 8th Dragoons on the left,\* should have scarcely suffered, and the whole of the Native troops have entirely escaped, although the latter were, from their modes of life, doubtless much exposed to the damps of the night, and to the heat and sun by day—nor why the Sudder Bazar, the most crowded and filthy of all the Bazars, should have enjoyed entire immunity. Lastly, whatever might be the influence of these exciting causes, how shall we, upon the supposition of nothing more being necessary to the production of the pestilence than their existence simply, account for their lying dormant, during the burning months of June and July, and after a short period of action, for their again becoming inert towards the end of August ?

It was the opinion of the Surgeon of the Corps, that latterly the disease had become

\* The Hospital of this Regiment was situated near the Hospital and Barracks of the 14th, and subject therefore to the same local influences. But, then, it was a remarkably fine and spacious building.

contagious. This opinion was grounded upon his observing, that the Apothecary of the Corps, the Hospital Serjeant, and an apprentice were successively attacked, and that several men were taken ill whilst nursing their dying comrades. But, it should be recollect~~ed~~, that all these persons, besides being equally exposed to the pestilential virus with the general body of the Corps, were in an especial manner rendered liable to its attacks, by watchfulness, incessant fatigue, despondency, and grief—all powerful debilitating, and predisposing causes. Moreover, without going at large into the argument, it may be stated, that the total exemption of the Medical Officers, notwithstanding their being in constant attendance upon the living, and frequently having to handle the dead, here, as in almost every other instance, is hardly reconcileable with a belief in infection; and that the unaccountable rise and speedy diffusion of the disease, its rapid increase and equally rapid decline, the narrow bounds of its influence amid great and unrestricted intercourse, its limited duration, and above all, its sudden and entire cessation without a single precaution being taken against its further extension, are facts decidedly characteristick, not of contagion, but of pure epidemical influence.—It was remarked, that in the 14th, fever and dysentery were less prevalent,

especially the latter, in August than in July, and that, in proportion to the strength of the Regiment, fever was more severe, but less frequent than in the other Corps.

Nearly at the same time when it broke out at Meerut, the Epidemick displayed itself in Kurnooos, at Bareilly, and at Moradabad to the East, and at Kurnaul to the West. It visited Almora on the 10th of August; and disappeared about the middle of September, after a great fall of rain from the East. It confined itself to the suburbs in the South East angle of the town, which were inhabited by persons of the lowest casts only ; and did not fairly enter the Sepoy Lines, or the body of the town. The disease was comparatively mild and easily checked. Twelve deaths only took place from 76 seizures. One Sepoy only of the 13th Native Infantry was seized, and even he got the disease when in the infected part of the town.—Few instances occurred of more than one of a single family being affected. The disease appeared to proceed in a westerly direction ; coming from Dotee on the East bank of the river Kalee to Almora, and moving thence towards Kassipoor to the West. It was accompanied by a westerly wind ; a moist atmosphere ; and a température from 70 to 76—We have no note of the effects produced by the disease at Bareilly.

The mortality could not, however, be great; since the Jails in the quarter from July to October gave only nine admissions and three deaths. At Moradabad it was more deadly. During the month the deaths in the town were from twelve to sixteen daily. In the Jails, out of 700 persons, there were only four admissions, and two deaths.

The disorder shewed itself at Kuraul on the 10th of August, and wholly disappeared in September. It attacked the 2nd Battalion 26th Native Infantry first, and most severely. It had 10 cases and 5 deaths. Part only of this Battalion was with the Hansi Division in August of the former year; the whole was now present. The 2nd Battalion 5th Native Infantry had 9 cases and 7 deaths; and the 6th Regiment of Cavalry 2 admissions and no death. Immediately upon the appearance of the disease, all the Corps were ordered to wear warm clothing.—From Kuraul the disease spread in the direction of Lood-heeana, but as in the former year, died away before reaching that station. Delhi, and every other station coming within the Division, now kept healthy; so that the only place visited was Kuraul, which had escaped on the former occasion.

After visiting Meerut, the disease seemed to take a Northerly course; reappearing in Saharapore, and attacking first the town and then the

cantonment. Neither in number, nor in violence, however, did the cases equal those of September and October of the former year. There were only 14 cases and 4 deaths in the Provincial and Nussuree Battalions, and in the Jails only one case, and no death.—On the 2d October it first entered the Deyra Dhoon ; and although it remained only three days in the valley, it worked fearful desolation during its stay. Of the deaths in the village we have no certain information; all that we learn, being that they were very numerous ; but in the Sirmoor Battalion the seizures, out of a body of 900 men, were 118, and the deaths 74, almost two thirds ; and in the Lines, 73 women and children were cut off. This almost unprecedented mortality is accounted for from the circumstance of the Medical Officer being himself early seized with the disease ; and the miserable sufferers being thence in a great measure left to their fate. It will be observed that the successive affection of Kumaoon and the Dhoon, which are both situated beyond the lowest range of the Himmalaya, greatly weakens the force of some preceding deductions on the inaptitude of the disease to ascend mountainous tracts. On the other hand, the stopping short of the virus, without seeming cause, both in this and the former year, on the hither side of the Northerly station of Loodeehana, might perhaps fairly give

rise to the consolatory conjecture, that the pestilential virus cannot live in the higher latitudes.

During the last half year the Epidemick has certainly been on the decline in the Lower Provinces. The Jail Returns, which yield a pretty good criterion by which to judge of the health of their respective districts, have been generally favorable, and in many instances perfectly clean.\* The

\* The H. C. Shipping at the new Anchorage was again visited during the equally irregular weather of September. As on the former occasion some vessels wholly escaped, and others suffered severely. But the case of the Carnatic was peculiar. This Ship anchored in Madras Roads on the 5th of August; clean, and with a healthy crew. Whilst at anchor she had six cases of Cholera, all terminating favorably. She sailed on the 20th with fine weather and light breezes.—On the night of the 27th, a robust man, who had recovered from an attack at Madras and returned to duty, was reseized and died at 2 A. M. of the 28th. At 8 P. M. of the 29th, the Joiner was seized, and died at 9 A. M. of the 30th. At 4 A. M. of the 30th a healthy Seaman, 35 years old, was seized, and died at midday. In the same morning, of two other healthy lads taken ill, one died at 3, and the other at 6 P. M. Another man was seized in the succeeding night, and died in seven hours. At 8 A. M. of the 31st a healthy, stout, middle aged Seaman dropped down in convulsions; and died at 6 P. M. After this there were six other cases, but all terminated favorably. The sudden mortality in this instance appears to have been wholly produced by the unfavorable state of the atmosphere. The Ship seems in her passage up the Bay to have kept close in with the shore;

disorder has perhaps in no one quarter raged with its former violence; and wherever its attacks have been such as to attract particular notice, their severity could generally be attributed to some sudden change, or marked irregularity of the weather. Thus, Calcutta continued tolerably healthy until the end of the Rains, which suddenly broke up about the middle of October, and after two or three cold, sharp days, with clear sky and Northerly wind, were succeeded by nearly a month of such damp, disagreeable weather, as to the experienced eye clearly forebod-

and during the 6th, was off Ganjam within 15 miles of the land, with a cold damp land wind blowing all day. The disease had no appearance of contagion. It occurred only among the Seamen, although between their condition and that of the soldiers there was only this difference, that they slept on the gun and the soldiers on the orlop deck. Some were seized, who had no communication with the sick; whilst others escaped who constantly sat by their hammocks. There was nothing peculiar in the circumstances of the crew. Their diet was of fresh provisions. They were not unnecessarily exposed; for an awning was spread fore and aft. The whole of the persons seized were of sober, regular habits. They had all drunk largely of cold water previously to being taken ill. In those who recovered, the attack was succeeded by bilious purging. Venesection failed in several.

The disease is now (December) prevalent in some spots of Nuddea, and among the Cooley establishment employed in clearing the island of Saugor; but, as far as we are acquainted in no other part of Bengal—that is as an Epidemic.









